A MONOGRAPH OF THE GENERA *CALIDVIANA*, *USTRONIA*, *TROSCHELVIANA*, AND *SEMITROCHATELLA* (MOLLUSCA: ARCHAEOGASTROPODA: HELICINIDAE) IN CUBA

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CONTENTS

ABSTRACT

This is the fourth in a series of papers on the representatives of the land prosobranch family Helicinidae in Cuba. The numerous taxa in Cuba previously assigned to the genus *Eutrochatella* were investigated. The conclusion was reached that *Eutrochatella s. s.* does not occur in Cuba. The Cuban forms which were previously placed in *Eutrochatella* are now assigned to five genera and two subgenera, using names which had previously been applied as subgenera or sections of *Eutrochatella*. No new superspecific taxa are introduced. All taxa hitherto proposed on the specific and subspecific levels were investigated: 29 species are recognized and one subspecies is described as new. Some conclusions regarding the phylogeny of the tribe Vianini, to which all the forms discussed belong, are advanced. It is assumed that the tribe originated in Central America, reached Pinar del Río via Yucatán and from there spread to other parts of Cuba.

INTRODUCTION

The family Helicinidae has been divided into four to six subfamilies (Thiele, 1929; Wenz, 1938; Keen, 1960), the most important of which are the Helicininae and the Proserpininae. The latter is composed of three tribes, the Proserpinini, the Stoastomatini, and the Vianini (Thompson, 1968: 51). The genera *Ustronia*, *Troschelviana*, *Calidviana*, and *Semitrochatella*, treated in the present study, as well as *Viana* and *Priotrochatella* treated previously (Clench & Jacobson, 1969; 1970a) belong to the tribe Vianini of the Proserpininae.

The Vianini are found in Jamaica, Cuba, Hispaniola, Puerto Rico, and the Bahamas. Only one genus, *Pyrgodomus*, occurs on the mainland in Central America. Hence this neotropical tribe must be considered West Indian.

The species contained in the Vianini can generally be recognized by their shells. While most helicinids are denticulate or depressed helicoid in shape, the Vianini are generally turbinate or low to elevated conic. In addition, all have a sharply raised, nipplelike or mucronate protoconch. Even when the shell is depressed, as in the genus *Priotrochatella* from the Isle of Pines, the elevated protoconch places it in the Vianini. This type of shell, together with a distinctive large lateral tooth complex of the radula (Baker, 1922), characterizes the group.

In some species of *Helicina s. s.* in Cuba (*lembayana* Poey, *subdepressa* Poey) as well as *neritella* Lamarck from Jamaica, the type of the genus, the spire is also somewhat raised, but a close examination reveals that the protoconch is almost planiform, with low sides that slope sharply. In the Vianini the protoconch is far more elevated, generally with the sides almost perpendicular to the base. Moreover, the more or less high conic form, common in the Vianini, is not seen in the Helicininae. The shells of the Vianini are also generally without a periostracum, but in life are frequently incrusted with a lighter or heavier layer of presumed inorganic material, which in some specimens shows signs of pseudosculpture such as keels and axial or spiral cords. Aguayo (1932: 32) supposed this layer to be the feces of the animal, but we have been unable to find anything in the literature regarding the chemical composition of this layer or its manner of deposition.

HISTORY

Blainville (1824: 235) first separated the group which we now call Vianini from the genus *Helicina*. He proposed the name *Ampullina* (non Bowdich, 1822) mentioning only *Helicina striata* Blainville (non De France, 1821). In 1825 he figured his *H. striata* showing a strongly mucronate spire but with a peculiar operculum which is unknown in the Helicinidae. Hence his type for the preoccupied *Ampullina* must be considered a nomen dubium (Clench & Jacobson, 1968: 9). Swainson (1840: 337) proposed *Trochatella* as a genus for *Heli-*

cina pulchella Gray (1825) apparently in recognition of the Vianini-like shell. This taxon was generally accepted, and several new species were described as *Trochatella* by Pfeiffer and Arango. Fischer (1885: 796), seeing that the name had been preoccupied by *Trochatella* Lesson, 1831, substituted the name *Eutrochatella*. Wagner (1907–1908) accepted *Eutrochatella* and divided the genus into several subgenera and numerous "Formenkreise," making use of shell and opercular characteristics for his new taxa. His work is unfortunately marred by numerous errors and disregard for earlier work and is illustrated with artificial looking figures which are frequently impossible to relate to natural forms.

An important paper in the study of the Helicinidae was published by H. B. Baker (1922). He worked principally with the radula, depending upon Wagner for the shell characteristics associated with this criterion. In the present work we lean heavily upon Baker's discussions (1922, 1926, 1928, 1956) but treat several of his subgenera as genera and his "sections" as subgenera. The category "section" has been eliminated from the taxonomic hierarchy (International Code Zoological Nomenclature, Art. 42d) but the distinctions noted by Baker deserve supraspecific recognition.

The last important contribution on the supraspecific level was the erection of the genus *Semitrochatella* by Aguayo & Jaume (1958) to accommodate species having a Vianini-like shell but several Helicininae-like radular characteristics (see below).

Baker (1922: 31) separated the Helicinidae into two subfamilies, the Helicininae and the Vianinae, based upon characters of the radula. In 1928 (p. 46) he reduced the family Stoastomidae C. B. Adams, 1849 to Stoastominae as an additional subfamily of the Helicinidae. In 1956 (p. 28) he included both the Stoastomatinae (which he emended from Stoastominae in accordance with Art. 11 (e) of the Code) and Vianinae as tribes in the subfamily Proserpininae Thiele, 1929. Keen (1960: 287) did not follow Baker, for she regarded the Stoastomatinae as a full subfamily and expanded the limits to include, in addition to the genera placed there by Baker, all the groups for which Baker had originally created the Vianinae.

Thompson (1968: 50–51) summarized the findings of Baker and others and elaborated Baker's (1956) stenographically presented ideas. He agreed with Baker's division of the Proserpininae into three tribes and, following Recommendation 29 (a) of the Code, called the tribes Stoastomatini, Vianini, and Proserpinini. This is a satisfactory arrangement, because it recognizes the essential similarity of the radula in the three groups and still acknowledges their strong conchological differences.

In addition to the Neotropical Vianini genera mentioned above, the Old World helicinid genera *Calybium* Morelet and *Geophorus* Fischer are also referred to this tribe. This arrangement is essentially the same as in Wenz (1938).

RADULA

In the following discussion we, as did Thompson (1968), follow the terminology of Baker (1922: 30).

The lateral tooth, also called the capituliform complex, is actually composed of two units, a larger comb-lateral and a smaller accessory plate. In the Proserpininae the comb-lateral plate generally assumes the shape of a mushroom or a crude letter T (Fig. 1). Hence Baker termed it the T-lateral. The accessory plate, which "meshes" with the larger T-lateral, is reduced in size and roughly triangular or occasionally rhomboid in outline. In the Helicininae the comb-lateral is irregularly elongate-rhomboid in shape. The base, which in Proserpininae forms the stem of the "mushroom" or the central bar of the "T," is situated terminally. The

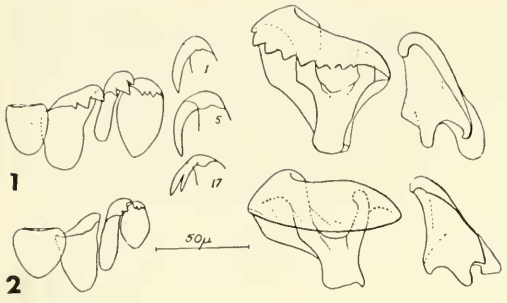

Figure 1. Radula of *Troschelviana* (*Troschelviana*) *erythraea* showing the central, marginal, and T-lateral teeth. 2. Radula of *Troschelviana* (*Microviana*) *rupestris*, showing central teeth and lateral T-complex (after Baker).

accessory plate, which is comparatively larger than in Proserpininae, is anvil-shaped.

The Vianini radula is characterized by having the typical T-lateral tooth of the Proserpininae. The cusps on the paired central teeth as well as on the lateral are, in general, reduced or absent. Thompson (1968: 50) wrote: "In the primitive taxa [of the Helicinidae] all of the paired central, lateral and marginal teeth have well developel acuminate cusps . . . . The major evolutionary trend in the family is modification and specialization of the capituliform complex and simplification of the central teeth." This view differs from the one expressed by Clench & Jacobson (1970: 62). We felt that since the "smooth" radula appears in both the old and new world tropics, this type must be the more ancient.

Baker (1922) separated the species of *Eutrochatella s. s.* from those of *Troschelviana* on the following radular characteristics: in *Eutrochatella* the single R-central rhachidian tooth is ovoid to circular in shape; in *Troschelviana* it is triangular ovoid to broadly elliptical. The T-lateral tooth of *Eutrochatella*, as well as the three paired centrals, are without cusps, or very occasionally with a single one, whereas in *Troschelviana* the T-lateral has five to ten cusps, and the centrals three to four each. Finally the radula of *Eutrochatella* has 62 to 90 marginals and 135 to 191 teeth per row; *Troschelviana* has 44 to 64 marginals and 99 to 103 total teeth per row.

DISTRIBUTION

In our arrangement of the Cuban Vianini we have made use of the cusped or uncusped nature of the radular teeth as well as certain shell characteristics. On this basis we concluded that the genus *Eutrochatella s. s.* with an uncusped T-lateral and a strongly sculptured shell does not occur in Cuba. *Calidviana* has the roughly sculptured shell typical of *Eutrochatella* but cusped central and lateral teeth like those of *Troschelviana*. *Ustronia*, on the other hand, has a *Eutrochatella*-like radula, but the relatively unsculptured shell is like *Troschelviana*. In this respect it is similar to *Viana* (Clench & Jacobson, 1968). We have already explained the characteristics of *Semitrochatella* (p. 405).

The tribe Vianini, which probably originated in neighboring Central America, underwent its greatest radiation in Cuba and Jamaica. In southeast Asia *Calybium* is like *Eutrochatella* in possessing uncusped radular teeth and a strongly sculptured shell surface. The shell of *Geophorus* is smooth like *Troschelviana*; its radula has not been examined. Both genera differ from the Neotropical Vianini in having a strongly depressed shell, the apex, however, being mucronate as in most Vianini.

In the western part of Cuba, the Vianini display an interesting morphological sequence. *Priotrochatella* is the only group in the area of Cuba with *Eutrochatella*-like uncusped central and T-lateral teeth and highly sculptured shells, and probably represents an introduction from Jamaica (Clench & Jacobson, 1970). The genus *Ustronia* has a smooth or uncusped radula and a smooth shell. The cusps in *Troschelviana s. l.* vary: in the subgenus *Cubaviana* the T-lateral has "a few scallops and points near the outer edge of the margin," and in

Table 1.

Distribution of the Species of *Calidviana*, *Ustronia*, *Troschelviana*, and *Semitrochatella*.

	I	P	H	M	L	C	O[1]
Troschelviana (Cubaviana) scopulorum	×						
T. (C.) rubromarginata		×					
T. (C.) pyramidalis		×					
Troschelviana (T.) chrysochasma		×					
T. (T.) jugulata		×					
T. (T.) erythraca		×					
T. (T.) mestrei		×					
Semitrochatella elongata		×					
S. fuscula		×					
S. alboviridis		×					
S. babei		×	×	×			
S. conica		×	×	×	×		
Ustronia acuminata acuminata		×					
U. acuminata columellaris		×					
U. sloanii aedilii				×			
U. sloanii sloanii		×	×	×			
Troschelviana (Microviana) callosa	×						
T. (M.) rupestris		×	×	×			
T. (M.) hians					×		
T. (M.) petitiana					×		
T. (M.) pfeifferiana najazaensis						×	
T. (M.) continua							×
T. (M.) granulum							×
T. (M.) holguinensis							×
T. (M.) methfesseli							×
T. (M.) tumidula							×
T. (M.) pfeifferiana pfeifferiana							×
T. (M.) spinopoma							×
Calidviana littoricola							×

[1] I—Isle of Pines; P—Pinar del Río; H—Havana; M—Matanzas; L—Las Villas; C—Camagüey; O—Oriente.

the subgenus *Troschelviana s. s.* this plate "bears a number of well-marked cusps on its inner edge." (Baker, 1922: 60). The shells of *Cubaviana* and *Microviana* have spiral as well as axial sculpture, whereas the shell of *Troschelviana* shows only the usually fine incremental lines and occasionally very weak axial lirations. The largely Bahamian genus *Calidviana* has the cusped radula of *Troschelviana* but the strongly sculptured shell of *Eutrochatella*. Its limited presence in a narrow territory along the northeastern coast of Oriente Province strongly suggests that it is an introduction from the nearby Bahamas.

The six genera and subgenera discussed in this study are more strongly represented in the western than in the eastern part of the island. Four are found in Pinar del Río, three in both Havana and Matanzas, two in Las Villas and only one in Camagüey and Oriente. In the latter there appear to be two, but one of these, *Calidviana*, as we have noted, probably did not develop in Cuba. Only *Troschelviana s. s.* is limited to a single province, Pinar del Río. *Ustronia* is found in Pinar del Río, Havana, and Matanzas; *Cubaviana* appears in Pinar del Río, and the Isle of Pines. The subgenus *Microviana* alone reaches the easternmost provinces of Camagüey and Oriente (Table 1).

Of the 30 specific and subspecific taxa we recognize, none is found in all of the six provinces. The most widely distributed species, *Semitrochatella conica* (Pfeiffer),

is found in the four westernmost provinces (Pl. 7). Interesting examples of radiation are seen in the subgenera *Troschelviana s. s.* and *Cubaviana*, where, of the nine species listed, six are limited to Pinar del Río. Two others occur in the neighboring Isle of Pines. On the other hand, the subgenus *Microviana* is almost exclusively eastern, seven of the ten taxa being found only in Oriente (Table 1).

The single member of the tribe Vianini in Camagüey is *Troschelviana* (*Microviana*) *pfeifferiana najazaensis* new subspecies. This situation is probably a reflection of the fact that Camagüey remains the most poorly collected of all the Cuban provinces. Havana and neighboring Matanzas have four and five taxa respectively, all either in the genera *Ustronia*, *Semitrochatella*, or *Microviana*. Neither province has any representatives of *Troschelviana s. s.* or *Cubaviana*, the latter and *Microviana*, however, appearing in the Isle of Pines. Las Villas has three species, one each in *Cubaviana*, *Microviana*, and *Semitrochatella*.

The distribution of the species and subspecies of Vianini confirms the picture presented by the supraspecific taxa. The first representatives of the tribe probably appeared in Pinar del Río, where we find today 14 of the 30 valid taxa. From here they spread sparsely to the neighboring provinces. *Microviana*, which probably derived from *Semitrochatella*, alone reached the two easternmost provinces, Camagüey and Oriente.

In Oriente, however, a surprisingly rich radiation took place. Seven of the twelve species of *Microviana* are found nowhere else. Since these organisms are all small, wind dispersal (Darlington, 1957: 17–20) can be regarded as a possible agent, and those individuals or ova of the strictly calciphilous species, which were deposited in limestone areas, survived. Isolation in a generally volcanic terrain resulted in speciation.

Previously (Clench & Jacobson, 1971) we concluded that the genus *Emoda* of the Helicinidae was probably derived from *Alcadia*, a genus endemic to northern and eastern South America and the Greater Antilles. Since Oriente is closest to the other West Indies, we assumed that *Emoda* first appeared there in Cuba. Furthermore, as expected, this is where the largest number of *Emoda* species is found.

The Vianini, however, differ, for this tribe probably originated in Central America where the genus *Pyrgodomus* Crosse & Fischer, its possible progentior, still occurs. The rich radiation of this group in the westernmost part of Cuba suggests that it first reached Pinar del Río, the point nearest to Yucatán. The only subgenus eventually to reach Oriente is *Microviana*.

NOMENCLATURE

The isolated populations of some species of gastropods in Cuba have developed rather striking variations. As a result many taxa were proposed on differences in color and size (or other minor features). The simplest way the taxonomic and diagnostic validity of these criteria could be evaluated was by studying the representative distributions of the various populations on the island. Marking the provenience of populations on a large map of Cuba quickly revealed either a clear geographic separation of easily separable forms or disclosed a random distribution associated with a single variable group, many of whose features had not yet become fixed. In their study of the *Cerion* of Bimini, Mayr and Rosen (1956: 1) stated, ". . . . variability is either due to true introgression (gene exchange between species) or due to gene flow among well-differentiated allopatric populations of the same species." In the case of the *Ustronia acuminata* complex and especially *Troschelviana chrysochasma*, as well as others, we feel that the second situation generally applies. We also agree with these authors (1956: 15) that ". . . the application of specific and subspecific names to population samples

has perhaps hindered more than facilitated an understanding of variations and evolution." Fortunately, in the present case a large proportion of such names remained in manuscript and hence presented no problem.

The complete absence of all paleontological data argues strongly that most of these forms, if not all, are of rather recent origin. It was shown by Mead (1961: 8) in the case of *Achatina fulica*, that in a matter of no more than 25 years, colonies isolated on the islands of the Pacific developed easily recognizable geographic forms which, were it not for our knowledge of the recency of such separation, could be taken for valid subspecies. The junior author (1966: 5) found a similar effect in the various colonies of *Cepea nemoralis* (Linnaeus) in Rockaway, New York. It is not at all unlikely that a similar condition, even if of somewhat longer duration, obtained in some of the land prosobranchs of Cuba.

ENEMIES

Harry (1950: 26) reported the presence of a round, drilled, countersunk hole in 10 to 25 per cent of the chondropomid land shells which he collected in Yucatán, Mexico. Several specimens of *Troschelviana rupestris*, *T. erythraea*, *T. holguinensis*, *T. hians*, and *Semitrochatella conica* show a similar hole near the aperture (Pl. 5, fig. 1) considerably smaller than the ones noted by Harry. As in the case of the operculates from Yucatán, the operculum of the prey frequently remained in place, thus leading one to the supposition that the unknown predator is able to consume the soft parts through this hole. Harry quoted Martens (1903) who reported that the larva of a beetle, *Drilus*, produced a similar hole in the Old World inoperculates *Helix* and *Bulimulus*. Possibly the predator in Cuba will prove to be a related organism.

TYPES

Our difficulties in locating some type material were described in our monograph on *Emoda* (1971). We encountered the same difficulties in the present case. The phrase "Type destroyed" in the text indicates that the type specimen had been deposited in the Natural History Museum of Stettin (Szczecin) where it was lost during World War II. "Type, MP?" means that the type is presumably in the Museo Poey of the University of Havana. All specimens referred to in this study are in the collection of the MCZ unless otherwise specified.

ABBREVIATIONS

BM(NH)	British Museum (Natural History), London
IZW	Instytut Zoologiczny Warszawa, Poland
MCZ	Museum of Comparative Zoology, Cambridge, Massachusetts
MP	Museo Poey, Havana, Cuba
USNM	United States National Museum, Washington, D. C.

MAPS

On most maps which we have consulted, the entire mountain complex in Pinar del Río bears the name Sierra de los Organos. In some later maps this name is confined to the western ranges, and the eastern portion is called Sierra del Rosario. Since topographic maps do not show a distinct break in the mountain range in Pinar del Río, we have chosen to keep the name Sierra de los Organos for the entire range and to consider other ranges, e.g., Rangel, Guacamaya, Rosario, etc., as referring to localized portions of the single greater mass.

A series of small mogotes are found at kilometer 14 on the road from Pinar del Río City to Viñales. These have no special name and are generally referred to as simply kilometer 14.

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SYSTEMATICS

PROSOBRANCHIA

Family Helicinidae Latreille, 1825
Subfamily Proserpininae Gray, 1847
Tribe Vianini H. B. Baker, 1922

Key to the Cuban Genera and Subgenera of the Tribe Vianini, Subfamily Proserpininae

1. Lateral tooth comb-shaped, basal column almost terminal, outer marginals with 5 cusps, shell generally high, trochoid ..... genus *Semitrochatella*
1. Lateral tooth T- or anvil-shaped, basal column medial, outermost marginals with 2 or 3 cusps, shell shape varied 2
2. T-lateral and paired central plates not denticulate 3
2. T-lateral and/or paired central plates denticulate 4
3. Shell strongly sculptured ..... genus *Eutrochatella* (not in Cuba)
3. Shell smooth or with weak spiral cords, relatively thin, generally large ..... genus *Ustronia*
4. Shell globose, strongly sculptured ..... genus *Calidviana*
4. Shell trochoid or depressed conic, generally smooth 5
5. T-lateral and paired central plates strongly denticulate, shell elevated conic ..... genus *Troschelviana*
5. T-lateral with few or no cusps, paired centrals denticulate 6
6. Shell size moderate, high trochoid ..... subgenus *Cubaviana*
6. Shell very small, depressed conic ..... subgenus *Microviana*

Genus *Calidviana* H. B. Baker

Callida Wagner 1908, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 2, p. 113 (type-species, *Helicina callida* [*sic*]; *calida* Weinland 1862, monotypic, *non* Agassiz 1846 [Lepidoptera]).

Calidviana H. B. Baker 1954, Nautilus, 67: 139, new name for *Callida* Wagner 1908.

Bakerviana Aguayo & Jaume 1957, Mem. Soc. Cubana Hist. Nat., 23: 118 (type-species, *Eutrochatella littoricola maisiana* Aguayo & Jaume 1957, original designation).

Description. Shell small, subglobose, solid, with strong spiral ridges. Umbilical callus thick and pronouncedly raised above the basal surface. Central and T-lateral teeth denticulate with strong cusps, marginals variously cusped, not very numerous.

Remarks. Though well represented in the Bahamas, this genus has only a single species in Cuba. The radula with its cusped central and T-lateral teeth associate the group with *Troschelviana* rather than with *Eutrochatella*. The cusped marginals are also found in *Ustronia chrysostoma* (=*sloanii* Orbigny) although *Calidviana* has a smaller number of such teeth, about 33 in *Calidviana* as compared to about 40 in *Eutrochatella*. This difference is not enough to exclude *Calidviana* from the genus *Troschelviana*. However, the lower outline of the shell and the strong sculpture indicate relationship with *Eutrochatella s. s.* Hence *Calidviana* might stand as a full

genus, characterized by a *Eutrochatella*-like shell and a *Troschelviana*-like radula.

Calidviana littoricola (Pfeiffer)
Plate 4, figure 13

Helicina littoricola (Gundlach MS) Pfeiffer 1861, Malak. Blät., 7: 25 (type-locality, bei Baracoa an der Meeresküste an Steinen; lectotype, here selected, MCZ 86610, Baracoa, ex. Gundlach; paralectotypes, same data, MCZ 273211).

Helicina littoricola Gundlach. Pfeiffer 1865, Monographia Pneumonopomorum Viventium, Suppl. 2, p. 219; Arango 1879, Contribución Fauna Malacológica Cubana, p. 45.

Helicina littoricola Gundlach. Sowerby 1866, Thes. Conchyl., London, 3: 283, pl. 269, figs. 121–122.

Eutrochatella (*Eutrochatella*) *littoricola* Pfeiffer. Wagner 1908, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 2, p. 114, pl. 21, figs. 22–23.

Eutrochatella (*Bakerviana*) *littoricola maisiana* Aguayo & Jaume 1957, Mem. Soc. Cubana Hist. Nat., 23: 118, pl. 1, fig. 5 (type-locality, Maisí, Baracoa, Provincia de Oriente, Cuba; holotype, MP 17399).

Description. Shell about 4 mm in height, subglobose, solid, lusterless, base little rounded. Color grayish white or very pale flesh colored, apex lighter, aperture yellow. Whorls 5¼, gently rounded, body whorl with a very obtuse keel, barely descending at aperture. Spire unevenly domelike, apex sharply raised. Aperture oblique, widely semilunate, yellow or orange within. Parietal wall with a strongly raised, somewhat glossy parietal callus, rounded at exterior margin, about the same extent as the aperture, joining the dorsal and basal lip margins. Palatal lip double, the inner lip being an extension of the margin of the parietal callus, raised sharply at the umbilical region where it is reflected to form a pseudo-chink. Columella weakly sigmoid, rounded at the insertion with the basal lip. Sculpture of diagonal, irregular growth lines crossed by much stronger, even, rounded, raised spiral cords, wider than their intervals, becoming obsolete near the umbilical region. Protoconch 1½ whorls, white, microscopically pitted, sharply raised above the succeeding whorls. Periostracum wanting. Operculum calcareous, whitish, with a low, rather wide external columellar ridge; outer margins with a narrow, low ridge.

Height mm	Width mm	
4.1	4.3	Baracoa, lectotype
4.2	4.0	" paralectotype
3.5	4.0	" "
3.5	4.3	El Bagá, Baracoa
4.5	4.3	" "

Remarks. This is an easily recognized form. The subglobose shape and the strongly sculptured surface are found in no other Cuban members of the Vianini. Nevertheless, it possesses the sharply raised apex which is characteristic of the tribe.

The genus has had its greatest development in the various islands of the Bahamas. *C. littoricola* is closely allied to *calida* (Weinland, 1862) from the Crooked Island group and Great Inagua, Bahamas, but the latter species has a much larger shell and has pronouncedly weaker spiral sculpture. The fact that in Cuba the range of *littoricola* is confined to a strip on the north coast near Baracoa argues strongly for its having had its origins in the nearby Bahamas.

In the colonies of this species, there are some variations in size and in comparative dimensions, some shells being smaller than others and greater in width than in height, others being larger and greater in height than in width. This may prove to be a secondary sexual characteristic.

Aguayo & Jaume (1957: 118) gave the subspecific name *maisiana* to a population at Maisí with an orange instead of yellow aperture. They stated that the nominate form comes from Cayojuín (Cayo Juin) and other areas north of Baracoa, whereas *maisiana* comes from the region to the south. However, a series of *littoricola* in MCZ (127457, Bermúdez collection) comes from El Bagá, well to the south of Baracoa (Pl. 8). Hence zoogeographical reasons

do not warrant the separation of the two forms which differ only in the color of the aperture. Moreover a large series of *C. calida* (Weinland) (MCZ 189022) from Great Inagua Island in the Bahamas, a possible ancestor of *littoricola*, shows a mixture of specimens with yellow and orange apertures. We must conclude that the color of the aperture is insufficient to establish taxonomic distinctions.

Specimens examined. ORIENTE. Baracoa; El Bagá.

KEY TO THE SPECIES OF *USTRONIA*

1. Shell, c.15 × 18 mm in size, rather thin shelled 2
1. Shell, c.12 × 13 mm in size, more solid 3
2. Shell without columellar blotch ..... *a. acuminata*
2. Shell with columellar blotch ..... *a. columellaris*
3. Shell up to 12 mm in height ..... *s. sloanii*
3. Shell less than 10 mm in height ..... *s. acdilii*

Ustronia Wagner

Ustronia Wagner 1908, *in* Martini & Chemnitz, Conchyl.-Cab., (2)1: sect. 18, pt. 2, p. 116 (type-species, *Helicina sloanii* Orbigny 1842, by subsequent designation, H. B. Baker 1922, Proc. Acad. Nat. Sci. Philadelphia, 74: 62; not *H. sloanei* Wagner *et auct.*).

Description. Shell moderately large, low to elevated turbinate, relatively thin, smooth, lip simple, moderately expanded, shallowly excavated in umbilical region; parietal callus narrow, often brightly colored. Axial and spiral sculpture present. Central and T-lateral radular teeth without cusps, as in *Eutrochatella*, but with a smaller number of unicuspid marginals.

Remarks. This group has the radula of *Eutrochatella* (see Troschel, 1857: 79, pl. 5, fig. 6) and the smooth shell of *Troschelviana*. In this way it occupies an analogous position to *Calidviana*, which has a *Troschelviana*-like radula and a *Eutrochatella*-like shell. In this genus we include the larger, rather thin-shelled species of western Cuba. The radula of *T. chrysostoma* Pfeiffer (=*sloanii* Orbigny) as pictured by Troschel (1857: 78, pl. 5, fig. 4) shows the uncusped smooth teeth of *Eutrochatella s. s.* Thus, we employ *Ustronia* Wagner as it was limited by Baker (1922).

Aguayo (1962: 9) tried to show that Baker's designation of *sloanii* Orbigny as the type of *Ustronia* was invalid, because, among other things, Baker was not justified in assuming that *sloanei* Wagner *et auct.* was indeed the same as *sloanii* Orbigny and that what was taken to be *sloanii* was actually a different species, *gouldiana* Pfeiffer. But Aguayo's discussion is irrelevant since there is no doubt that Baker clearly indicated his designation to refer to *sloanii* Orbigny 1842, the original and earliest form of the name. The spelling *sloanei* was a later emendation by Pfeiffer (1855). Moreover, there is little doubt that *gouldiana* Pfeiffer is a junior synonym of *sloanii*, a fact admitted by Pfeiffer himself (1855: 95). Later (1856: 138) Pfeiffer maintained the distinction of his species, but he did so on such relative bases as stronger sculpture, less elevated spire, and more depressed aperture. Our examination of large numbers of specimens from Pinar del Río, Matanzas, and Havana do not bear this out. Arango (1879: 42) also synonymized the two, but Crosse (1890: 307), having seen no specimens of either, felt that the published figures "nous semblent différer entre elles." A careful comparison of the published description of both taxa and an examination of specimens from near the type-locality of *sloanii* with large numbers of so-called *gouldiana* in the collection of the MCZ show that a valid differentiation is impossible.

The three taxa of *Ustronia* extend from Guane in Pinar del Río to Ceiba Mocha in Matanzas, with the strongest representation in the intervening Havana Province (Pls. 6, 7). In the west, from Guane to Viñales, we find *acuminata acuminata*, larger shells without the columellar stain. From San Andrés to San Diego de los Baños is found a somewhat smoother shell with an orange or yellow spot on the columella. From Sierra Anafe in Pinar del Río near the boundary of Havana, to Ceiba

Mocha in Matanzas is *sloanii*, a smaller shell without a columellar spot. There is also a colony of *sloanii* at Mariel, the northeastern corner of Pinar del Río Province near Havana.

Ustronia sloanii sloanii (Orbigny)
Plate 1, figures 9–12

Helicina sloanii Orbigny 1842, Mollusques, *in* Sagra, Histoire Physique, Politique, et Naturelle de l'Ile de Cuba, 1: 248, pl. 20, figs. 4–6 (type-locality, "l'intérieur de l'île au Cerro de Cuzco" [Pinar del Río]; type not in BM(NH), location unknown; not *H. sloanei* Potiez & Michaud 1836, Galerie des Mollusques, Paris, p. 299, [nude name]; nor *sloanei* Wagner *et auct.*).

Helicina sloanei Orbigny. Pfeiffer 1855, Malak. Blät., 2: 95 [error for *H. sloanii* Orbigny].

Trochatella chrysostoma Shuttleworth, *in* Pfeiffer 1850, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 1, p. 66, pl. 10, figs. 3–4 (type-locality, Cuba; type destroyed).

Trochatella gouldiana Pfeiffer 1850, Zeitschr. Malak., 7: 191 ("type-locality in insula Cuba"; type destroyed); Pfeiffer 1852, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 1, p. 67, pl. 10, figs. 5–6. Not to be confused with *Helicina gouldiana* Forbes 1851.

Eutrochatella (*Eutrochatella*) *chrysostoma* Pfeiffer. Wagner 1908, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 2, p. 111, pl. 21, figs. 3–5.

Eutrochatella (*Ustronia*) *sloanei* Orbigny. Wagner 1908, *op. cit.*, p. 118, pl. 23, fig. 16.

Eutrochatella (*Ustronia*) *gouldiana maris* Aguayo & Jaume 1953, Mem. Soc. Cubana Hist. Nat., 21: 270, pl. 31, fig. 5 (type-locality, Loma "Cantera Blanca," c. 2 km S of Playa de Baracoa, Bauta, Havana; holotype, MP 13253).

Eutrochatella (*Ustronia*) *gouldiana camoensis* Aguayo & Jaume 1953, *ibid.*, p. 270, pl. 31, fig. 6 (type-locality, Loma de Camoa, Portugalete, San José de las Lajas, Habana; holotype, MP 17305).

Description. Shell about 13 mm in diameter, broadly conic to depressed trochoid, relatively thin, generally sublustrous. Color various, grayish white, pale to light yellow, or faintly rufous, apex occasionally darker, lip and columella generally white. Whorls about 7, flat or moderately rounded, strongly carinate in juveniles, body whorl gradually descending at aperture, with an obtuse or moderately sharp carina, suture well impressed. Spire moderately high to low conic, sides flat or gently inflated, apex sharply raised. Aperture oblique, widely semilunate, evenly rounded at outer edge. Parietal wall flat or weakly inflated, with a thin, lustrous parietal wash that does not extend beyond the aperture. Palatal lip simple, barely flaring centrally, straight at dorsal and basal insertions, slightly thickened within. Columella barely convex above, almost perpendicular below, slightly thickened near the base, set off from the umbilical area by a white lamella and a barely raised, triangular protuberance. Sculpture of moderately strong, diagonal, irregular growth lines crossed by weak or strong, closely set spiral cords, generally weaker or obsolescent on the body whorl and base. Protoconch 1½ whorls, rounded, closely punctate, sharply raised. Periostracum wanting; shell frequently incrusted with a thin inorganic layer. Operculum brownish, thin, glassy, almost transparent in palatal region, with a strongly raised, milk-white, bent lamella at the columellar margin; inner layer extending beyond the margins of the glassy outer layer, not separated by a marginal sulcus.

Height mm	Width mm	
12.2	13.1	Sierra Anafe, Pinar del Río
9.2	9.7	San Antonio de los Baños, Habana
10.3	12.4	Camoa, Habana
10.1	10.7	El Grillo, Madruga, Matanzas
11.2	11.9	El Palenque, Matanzas
10.0	10.1	Ceiba Mocha, Matanzas

Remarks. This species differs from *U. acuminata* in being smaller, more fragile, and more depressed. The spiral sculpture is frequently quite strong and in such a case it is stronger than in any populations of *acuminata*. The columella rarely bears a colored stain. In this last way *sloanii* differs additionally from the neighboring *acuminata columellaris*. Only at Punta Sabanilla at the eastern limit of the range of the species, can occasional individuals

with a small orange stain near the parietal insertion of the columella be found. The operculum of *sloanii* is thinner, more transparent, and differently colored than the operculum of *acuminata*.

The strength of the spiral sculpture varies sharply. At Punta Sabanilla near the city of Matanzas, the spiral sculpture is quite strong, visible to the naked eye. At Sierra Anafe it is strong on the earlier whorls and very weak to obsolescent on the body whorl and the base. At Camoa the shells vary from being moderately to quite strongly sculptured. It is obvious that the spiral sculpture in this species is a variable characteristic of no diagnostic value in separating taxa.

Wagner (1908) discussed *chrysostoma* Pfeiffer and *sloanei* [*sic*] Orbigny, putting them into different subgenera. He overlooked *gouldiana* Pfeiffer, even as a synonym and Fulton (1915) did not notice this lapse. Arango (1879) synonymized *gouldiana* with *sloanei* [*sic*], giving several localities for its occurrence. However, for *chrysostoma* he gave only "isla de Cuba," apparently copying from Pfeiffer and indicating that he had collected no specimens himself. The *Ustronia* with the golden mouth is found at Sabanilla, near the city of Matanzas, and this is here selected as the type-locality. However, the golden mouth is not found in all specimens from Sabanilla and, besides, some individuals from the Sierra Anafe show indications of possessing that color in the aperture. Hence this feature cannot serve as a diagnostic distinction. This tinge of golden color is found also in the populations of *Emoda sagraiana* (Orbigny) at the Ensenada de los Burros near Luis Lazo in Pinar del Río. It is probably an unstable color form which cannot survive interbreeding.

The type-locality of *U. sloanii* is the Cerro de Cuzco, Candelaria, Pinar del Río. The series from Mariel is also from Pinar del Río, and hence these two localities represent the western limit of the species.

Specimens examined. Pinar del Río. Mesa de Mariel. Havana. Tapaste; Loma La Jaula, Tapaste. *Madruga:* Zanabria; La Chareta; Mogote La Curva; Pipian; Sitio Perdido; Paredones Entronque, Sierra El Grillo; El Inglés, Sierra El Grillo; eastern end of Sierra El Grillo; between Madruga and Aguacate. *Guayabal:* Peña Blanca, and Esperón (both Sierra de Anafe); Nazareno, Caimito de Guayabal. *Güines:* Gabina; Cuevas de Cotillas; Jamaica; Somorrostro near Jamaica. *Camoa:* Lomas de Camoa; Mendoza, Jaruco; Escalera de Jaruco; Central Merceditas, Milena del Sur; La Portada, Managua; El Altivo, Aguacate; San Antonio de los Baños; Finca Alianza, Cotorro. Matanzas. El Palenque; Ramona, El Palenque; Paredones de Punta de Sabanilla; near Matanzas; Ceiba Mocha; 5 mi. W of Ceiba Mocha; vicinity of Paradero de Ceiba Mocha; Mogote de Ceiba Mocha; Finca Mona, Canasí.

Ustronia sloanii aedilii Aguayo & A. Torre

Eutrochatella chrystostoma aedilii Aguayo & A. Torre 1954, Rev. Soc. Mal. 'Carlos de la Torre,' 9: 67, fig. p. 68 (type-locality, La Ensenadita, a medio kilómetro al oeste de la Boca de Bacunayagua, Matanzas; holotype, MP?).

Description. "This subspecies is distinguished from the typical race by having a considerably smaller shell. In addition, the apex is less pointed, the spire consisting of 5½ to 6 whorls while the typical [form] has 6½ to 7. The other shell characters (color, etc.) seem to be sufficiently similar in both races, although the spiral sculpture of this new subspecies consists of wider and more strongly marked lines than in the typical." (Translated.)

Length mm	Major diameter mm	Minor diameter mm	
7.3	8.4	7.2	holotype
8.3–6.6	9.4–7.5	8.0–6.4	paratypes

Remarks. We have not examined this subspecies. We keep it provisionally because of its unusually small size as well as

the fact that it appears to be sufficiently isolated at the periphery of the range of the species to be granted subspecific rank. According to the authors, the species is relatively abundant in the type-locality, the only place where it has been found. It is named for its co-discoverer, Edilio Estopinán.

Ustronia acuminata acuminata (Poey)
Plate 1, figures 1, 2, 4, 5, 6, 8

Helicina acuminata ("Velásquez" MS) Poey 1851, Memorias Historia Natural Isla de Cuba, 1: 112, pl. 5, figs. 13, 15 (type-locality, here restricted, Viñales, Pinar del Río; type, MP?).
Helicina lutescens Newc[omb] MS, fide Poey, *op. cit.*, p. 113.
Helicina blandiana Gundlach 1856, Malak. Blät., 3: 40 (type-locality, saxa ripae fluvii San Diego de los Baños; lectotype, here selected, MCZ 87885 [Cuba] ex Gundlach).
Helicina blandiana Gundlach. Poey, Memorias Historia Natural Isla de Cuba, 2: 14, pl. 1, fig. 19.
Helicina remota Poey 1858, *op. cit.*, 2: 87, pl. 8, fig. 26 (type-locality, Guane, montem Cubae occidentalem; type, MP?).
Eutrochatella (*Ustronia*) *acuminata* "Velásquez" Poey. Wagner 1908, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 2, p. 116, pl. 23, figs. 7–8, 10–11.
Eutrochatella (*Ustronia*) *acuminata blandiana* Gundlach. Wagner 1908, *ibid.*, p. 117, pl. 23, fig. 12.
Eutrochatella (*Ustronia*) *remota* Poey. Wagner 1908, *ibid.*, p. 118, pl. 23, figs. 13–15.
Viana acuminata Poey. Webb 1948, Foreign Land Shells, Rochester, N. Y., p. 143, pl. 65, fig. 5.
Helicina remota exhuberans "Torre" Aguayo 1962, Caribbean Jour. Sci., 2: 10 [nude name].

Description. Shell about 15 mm high, 18 mm wide, depressed to high turbinate, moderately thin, generally dull. Color pale yellowish or reddish white, more vivid in aperture, lip generally white. Whorls 7 to 7½, slightly swollen, body whorl rounded to sharply carinate, frequently with a short, wide, shallow groove near the palatal lip, not descending at the aperture. Suture well impressed. Spire depressed to raised conic, sides generally somewhat convex, apex raised, nipplelike. Aperture oblique, broadly semilunate, evenly rounded palatally. Parietal wall flat or variously inflated with a thin, highly lustrous parietal wash which extends only slightly beyond the aperture. Palatal lip entire, weakly expanded centrally, straight at terminations; upper lip faintly distorted by the shallow groove on the body whorl, occasionally with a shallow notch near the insertion in the body whorl. Columella short, slightly convex above, almost perpendicular below, slightly swollen in the center, with low, slightly curved, rather wide lamella at the insertion of the basal lip. Axial sculpture of strong, irregular, diagonal growth lines crossed by very faint, more or less regular spiral cords, widely and irregularly spaced on body whorl. Protoconch 1½ whorls, rounded, white, sharply raised, minutely punctate. Periostracum wanting, but shells frequently encrusted with a layer of inorganic matter. Operculum ear-shaped, columellar margin strongly twisted, with a high, rounded, narrow lamella reaching almost to the top. Outer layer white, lustrous; inner layer thin, brownish, darker toward the margins, extending slightly beyond the outer calcareous layer; outer margins thin.

Height mm	Width mm	
14.7	16.0	Sierra del Infierno
14.9	17.8	La Chorrera, San Vicente
15.2	15.4	Hoyo de Gallardo, El Queque, Viñales
10.2	14.2	La Muralla, Guane
12.2	14.6	Los Portales, Guane
13.6	16.1	Sierra Paso Real, Guane
15.1	16.0	Mendoza, Guane
11.0	11.0	lectotype of *blandiana*, San Diego de los Baños

Remarks. Specimens of *U. acuminata* from Guane, the type-locality of the synonym *remota*, especially those from La Muralla, have a depressed, rather strongly keeled shell with a flattened base. Specimens of *U. acuminata* from San Vicente and Viñales have an elevated shell with a well-rounded body whorl. Between these

two extremes every degree of intergrade is found. We can only conclude that *U. acuminata* is a variable species, whose populations do not possess variations having definite geographical separation or clear morphological distinctions. As in the case of *Emoda sagraiana* (Orbigny), *Ustronia sloanii* (Orbigny) and *Viana regina* (Morelet), these variations do not suggest that a cline is present. In addition to the shape of the shell, variations in color, which are scattered haphazardly throughout the range, are frequently found even within populations. *H. blandiana* seems to be merely a small form of *acuminata* such as is found in small, isolated mogotes.

In spite of these variations, the shell is not difficult to determine. Its generally large size, relatively thin texture, lack of strong sculpture, thin, narrowly expanded lip, and localization in the Sierra de los Organos geographic complex in Pinar del Río Province are diagnostic. It differs from *U. sloanii* (Orbigny) of Havana and Matanzas in its larger size, generally more elevated shape, thinner texture, in the weak rather than strong, even spiral sculpture on the upper whorls, and in the nature of the operculum.

In occasional specimens in different populations we find a small notch on the upper lip, somewhat like that found in male specimens of *Viana*. This might have a similar significance, but we do not have enough material at hand to determine this. It should be born in mind that we find the notch in so few specimens that it would be difficult to assume that it is found in all specimens of a single sex. It might prove to be nothing more than a deformation caused by roughness in the microhabitat.

This species ranges from Mendoza to Punta de la Sierra at Guane, but is not present in the large mountainous area reaching from the Sierra San Carlos at Luis Lazo, past the Sierra Cabezas and Sierra Gramales at Cabezas and the Sierra Quemado at Isabel María (Pl. 6). It appears again at the Sierra Viñales region and then extends, as the subspecies *columellaris*, in an unbroken range to the Sierra Rangel (Pl. 6). In this gap the species *Troschelviana jugulata* (Poey) replaces it. Probably here the two species entered into competition and in time *jugulata* replaced *acuminata*. In the area around Guane where the two species overlap, the case is not so clear. Three possibilities may here be recognized: 1) that the competition has not been of sufficiently long duration to have been decided in favor of one of the two species; 2) that the microhabitats they occupy differ ecologically and geographically so that in these places the two species do not enter into direct competition; and 3) that somehow *acuminata* was transferred from its range in Viñales and beyond to Guane while skipping the intervening areas.

Unfortunately not enough paleontological and ecological data are available, so that the answers must remain in the realm of speculation. See also below in *Troschelviana chrysochasma*.

Poey stated that this subspecies is found at San Diego and other places of the western mountain range, hence making San Diego de los Baños the type-locality. But we have found that San Diego de los Baños is well within the range of *acuminata columellaris*. Hence we are here selecting Viñales as the type locality of *acuminata* (Poey).

Specimens examined. Pinar del Río. *Guane:* Mendoza; La Pedrera, Mendoza; Sierra de Guane; Sierra Paso Real; Los Portales; La Muralla; Puerta de la Muralla. *Viñales:* El Queque; Hoyo de Juan Gallardo, El Queque; El Cuajaní; Valle de las Delicias; Mogote de Martín Miranda; El Cejanal; Mogote Dos Hermanos; Mogote de Lorenzo López; Hoyo de los Muertos Niños; Ensenada de Basilio Torres, Sierra del Infierno; Sitio del Infierno; Sierra Penitencia; Mogote de Guallarico, near Sierra Penitencia; Sierra de Viñales; Hoyo del Cimarrón, near Pan de Azucar. *San*

Vicente: La Guasasa, Puerta del Ancón; Hoyo de Fania, Palmarito; Baños de San Vicente; Ensenada de San Vicente; Sierra La Chorrera; Mogote Pequeño, Costanera de San Vicente. *Consolación del Norte:* Ensenada de los Borges, Canalete; Mogote Canelete; Abra de Bejarano.

Ustronia acuminata columellaris (Gundlach)
Plate 1, figures 3, 7

Helicina columellaris Gundlach 1856, Malak. Blät., 3: 39 (type-locality, scopulos, Rangel; type, MP?).
Helicina columellaris Gundlach. Poey 1858, Memorias Historia Natural Isla de Cuba, 2: 14, pl. 1. fig. 16.
Helicina columellaris Gundlach. Pfeiffer 1856, Novitates Conchologicae, 1: 84, pl. 23, figs. 11–13.
Helicina columellaris Gundlach. Sowerby 1866, Thes. Conchyl., 3: 284, pl. 270, figs. 148–151.
Eutrochatella (*Ustronia*) *acuminata columellaris* Gundlach. Wagner 1908, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 2, p. 117, pl. 23, fig. 9.

Description. The shells of this subspecies resemble those of the nominate form in size and shape, but differ in being generally somewhat higher, rounded or less sharply carinate at the periphery, and in having a yellow or orange-yellow stain at the columella.

Height mm	Width mm	
15.0	13.0	Rangel (type-locality)
16.0	15.8	Mogote Grande, San Andrés
19.1	18.5	Sierra La Güira
16.3	16.2	Sierra Galalón
15.4	14.4	Sierra Limones
13.0	12.2	Kilometer 14

Remarks. This subspecies is readily distinguished by the yellow or orange-yellow stain at the columella. This stain varies in size and intensity, but it is invariably present. Normally this character alone would not be of sufficient diagnostic value, but in the present case there are geographic considerations that support subspecific separation. *Ustronia acuminata* with an unstained columella extends from Mendoza to the area of Consolación del Norte, just to the west of Sierra San Andrés. *U. columellaris* with the stained columella occurs from the Sierra San Andrés and extends to the limit of the Sierra de los Organos at Rangel. It is also found as isolated populations at Kilometer 14 and El Guamá in the south.

The present subspecies differs also in being generally larger, glossier, and less strongly keeled. However, some variation occurs in the latter feature, from a well-rounded periphery in the population at Sierra La Güira and Rangel to a subcarinate form at Sierra San Andrés and Sierra Guacamaya.

The population at Sierra Guacamaya shows a wide, reddish, subsutural band, weakly defined at its outer margin. The shells are moderately high with the keel subcarinate. Nearby, at the Sitio de la Sierra in San Andrés, another population with a similar subsutural band is found. Here the keel of the shells is much weaker and the shells are somewhat higher. In spite of the strikingly different color pattern, we do not feel that a special name is necessary, since we regard it as a color variation that is probably not stable in the case of interbreeding.

Specimens examined. Pinar del Río. Mogote Lamas near the Entronque de Herredura; Bermejales; Hoyo de la Sierra, San Andrés; Falda de Pico Chico, San Andrés; Sitio de La Sierra, San Andrés; Mogote Grande, SW of Pico Chico, San Andrés; Ensenada de la Ayúa, San Andrés; Galalón; Cueva de Abano, Galalón; Colena de la Piedra, Galalón; Abra del Caiguanabo; Mogote de Caiguanabo; Mogote de los Portales, San Diego de los Baños; Mogote el Indio, San Diego de los Baños; Sierra La Güira; Sierra Guacamaya; El Toro, Sierra Limones; Sierra Rangel; Pedrera, Kilometer 14, Viñales; El Guamá, Viñales.

KEY TO THE SPECIES OF *TROSCHELVIANA S. S.*

1. Shell small, usually less than 6 mm in height, thin shelled, colors subdued 2
1. Shell larger, generally 9 to 11 mm in height, more solid, colors frequently vivid 3
2. Shell with acute, white basal carina ... *mestrei*
2. Shell with obtuse or rounded carina ..... *erythraea*
3. Shell acutely conic, solid, columellar blotch wanting ..... *chrysochasma*
3. Shell broadly conic, less solid, with red, yellow or orange columellar blotch ..... *jugulata*

Genus *Troschelviana* H. B. Baker

Troschelviana H. B. Baker 1922, Proc. Acad. Nat. Sci. Philadelphia, 74: 59 (type-species, *Helicina erythraea* "Wright" Sowerby 1866, original designation, as subgenus of *Eutrochatella*).

Description. Shell small to moderate in size, sharply elevated, quite smooth, sculptured generally only with faint axial growth lines. Color generally pale, either yellow, greenish or orange, occasionally with more vivid color at the aperture. Paired central radular teeth and T-lateral armed with rather high cusps, three on the central, about nine on the T-lateral. Periostracum generally wanting; shells frequently encrusted with layer of inorganic matter. Operculum auriform, composed of an outer calcareous layer of varied strength, color, and sculpture, and a thin inner chitinous layer, generally light brown or buff; columellar margin with a variously high, rounded lamella.

Remarks. The radula of *T. chrysochasma* (Poey) was described and figured by Troschel (1857: 79, pl. 5, fig. 6), and that of *T. erythraea* by H. B. Baker (1922: 59, pl. 6, fig. 27). These figures clearly show the contrast between the smooth radular plates of *Eutrochatella s. s.* and the cusped plates of *Troschelviana* and the subgenus *Cubaviana* (Fig. 1). We include in subgenus *Troschelviana* the species with small, smooth, rather sharply elevated shells.

Subgenus *Troschelviana s. s.*

Description. Shell very small to moderate in size, strong, smooth, elevated conic, with axial sculpture of fine growth lines. Spiral sculpture wanting.

Remarks. This subgenus is confined to Pinar del Río Province. We include in it the species with a smooth shell, without spiral sculpture, and with a high, almost turreted shape. The white, undulate axial lineolations within the shell substance, which Pilsbry (1933: 131) calls characteristic of the Helicinidae, are generally visible here under moderate magnification. However, in some specimens of *T. chrysochasma* Poey, they are less easily seen or even completely absent.

Troschelviana (*Troschelviana*) *erythraea* (Sowerby) Plate 4, figure 3

Helicina rubella 'Wright,' *in* Pfeiffer 1864, Malak. Blät., 11: 107 (type-locality, Cayos de San Felipe); Pfeiffer 1865, Monographia Pneumonopomorum Viventium, Suppl. 2, p. 237 (lectotype, here selected, MCZ 73779, Cayos de San Vicente, ex Wright; not *Helicina rubella* J. Green 1833).

Helicina erythraea "Wright" Sowerby 1866, Thes. Conchyl., 3: 284, pl. 278, figs. 461–463 (no locality; type, BM(NH) 1969101).

Helicina rubella Wright. Arango 1879, Contribución Fauna Malacológica Cubana, p. 55.

Eutrochatella (*Ustronia*) *rubella* "Wright" Pfeiffer. Wagner 1908, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 2, p. 126, pl. 24, figs. 24–25.

Eutrochatella (*Ustronia*) *rubella citrinocallossa* Wagner 1908, *ibid.*, p. 126, pl. 24, figs. 26–27 (Vignales auf Cuba; type, IZW 8561).

Helicina chryrochasma [*sic*] var. *calloflava* Wagner 1908, *ibid.*, p. 127 (as synonym of *citrinocallossa*).

Eutrochatella (*Troschelviana*) *erythraea* ("Wright" Sowerby). H. B. Baker 1922, Proc. Acad. Nat. Sci. Philadelphia, 74: 59, pl. 6, fig. 27 [radula].

Description. Shell about 6 mm in height, elevated conic, sublustrous, moderately thin, apex acute. Color pale reddish brown, occasionally greenish yellow, base lighter, lip white. Whorls $7\frac{1}{2}$, rather flat, body

whorl obtusely carinate or rounded, base moderately inflated, suture weakly impressed. Aperture oblique, widely semilunate, bright orange-yellow, outer margin evenly rounded. Parietal wall with a triangular, slightly swollen callus at the columella. Palatal lip thin, slightly thickened within, mildly flaring but not reflected, white or lighter than the rest of the shell. Columella short, evenly rounded at insertion into the basal lip. Sculpture of very fine, frequently somewhat wavy, diagonal growth lines; spiral sculpture wanting. Protoconch 1½ whorls, same color as rest of shell, microscopically pitted, raised above succeeding whorls. Periostracum wanting, but shells are frequently encrusted except at parietal region. Operculum thin, glassy, pale yellow, outer margin darker.

Height mm	Width mm	
6.0	4.1	Cayos de San Vicente, Viñales, lectotype
5.3	4.2	Cayos de San Felipe
5.8	4.8	"
5.7	4.9	"
6.1	5.5	Cayos de San Diego
6.2	5.2	"

Remarks. The shells of this species differ from those of *alboviridis* in their larger size, their predominantly brown or yellow color, and in the absence of darker apical and basal areas. They have a narrower shape and a more acute carina than *mestrei* in addition to being colored differently.

The species probably has a wider distribution than the records available to us would indicate (Pl. 8). As in the case of many small shells in Cuba, they tend to be overlooked by collectors.

Specimens examined. Pinar del Río. *Viñales:* Cayos de San Vicente; Cayos de San Felipe; El Queque. *Consolación del Norte:* Canalete.

Troschelviana (Troschelviana) chrysochasma (Poey)

Plate 3, figures 10, 11, 12, 13, 16, 17

Helicina chrysochasma Poey 1853, Memorias Historia Natural Isla de Cuba, 1: pl. 25, figs. 17–19 [figure only]; Poey 1858, *ibid.*, 2: 26 [description], (type-locality, Rangel; type, MP?).

Trochatella chrysochasma Poey. Troschel 1857, Gebiss der Schnecken, 1: 79, pl. 5, fig. 6 [radula].

Helicina jucunda Gundlach. Pfeiffer 1863, Malak. Blät., 10: 197 (type-locality, in parte occidentali insulae Cubae; lectotype, here selected, MCZ 86604, ex Gundlach).

Helicina chrysochasma Poey. Sowerby 1866, Thes. Conchyl., 3: 285, pl. 270, fig. 160–162.

Eutrochatella (Ustronia) chrysochasma Poey. Wagner 1908, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 2, p. 127, pl. 25, figs. 8–9.

Eutrochatella (Ustronia) chrysochasma hernandezi Wright. Wagner 1908, *ibid.*, p. 128, pl. 25, figs. 3–4 (type-locality, Vignales auf Cuba; type, IZW 8567).

Eutrochatella (Troschelviana) chrysochasma (Poey). H. B. Baker 1922, Proc. Acad. Nat. Sci. Philadelphia, 74: 59.

Eutrochatella chrysochasma mendozana Pilsbry 1928, Nautilus, 41: 79 (type-locality, Caves near Mendoza, Pinar del Río, Cuba; holotype, ANSP 141897; paratypes, MCZ 12487).

Eutrochatella (Troschelviana) jaumei Clench & Aguayo 1957, *in* Aguayo & Jaume, Mem. Soc. Cubana Hist. Nat., 23: 120, pl. 1, fig. 8 (type-locality, Mogote de la Finca "La Esperanza," San Andrés, Consolación del Norte, Provincia de Pinar del Río; holotype, MP 13262). Contrary to the statements of the authors, there are no paratypes in MCZ.

Description. Shell elevated, narrow, conic, reaching about 11 mm in height, but varying to about 7 mm, shining, strong; color generally confined to aperture, parietal wall, and occasionally the spire, varies from bright orange to pale yellowish and white; rest of shell bluish or yellowish white, occasionally flesh colored. Whorls 7 to 8, flat; body whorl gently rounded or with a variously sharp carina, not descending at aperture. Suture well impressed. Spire high conic, occasionally colored like aperture. Apex acute. Aperture oblique, widely semilunate, generally bright orange,

lemon-yellow or pale yellow within, rarely white. Parietal wall smooth with a rather narrow, weakly raised parietal callus colored like the parietal wall, irregularly rounded at outer edge. Palatal lip weakly expanded except at both terminations, with a rounded groove separating the peritreme from the body whorl; a rounded thickening at point of basal insertion, colored like the parietal wall. Columella short, deeply concave. Sculpture consisting only of very fine diagonal, irregular incremental lines. Narrow, white undulate lineolations in the shell substance are also visible. Protoconch $1\frac{1}{2}$ whorls, raised, rounded, minutely pitted, white or generally of the same color as the aperture, occasionally somewhat lighter. Periostracum wanting. Operculum thin, weakly concave, orange, yellow or white, with a raised, rounded parietal margin; outer margin with a shallow marginal sulcus.

Height mm	Width mm	
8.9	5.7	Paso Real, Guane
6.8	4.7	Constanera de San Vicente, Viñales
7.9	5.9	Laguna de Piedras, Viñales
10.5	7.7	El Abra, Viñales
6.9	4.7	Las Delicias, Viñales
10.2	6.6	Mogote de la Mina Constancia, Viñales
10.8	6.7	Sierra del Infierno, Viñales
8.8	6.4	Sierra del Infierno (peak), Viñales
9.3	6.8	Rangel, Consolación del Norte
8.6	6.1	Rangel, Consolación del Norte
8.9	5.4	La Güira, San Diego de los Baños
9.8	6.5	Galalón, Consolación del Norte
6.5	5.0	Mendoza, Guane (*mendozana* Pilsbry)
6.0	4.6	Viñales, (*hernandezi* Wagner)
9.2	9.2	*jucunda* Gundlach

Remarks. As evidenced by the measurements, this is a highly polymorphic species; it would be easy to apply subspecific or varietal names to several of the populations. The late Dr. de la Torre did so in manuscript, and lots bearing unpublished names are in many museums and private collections. However, after mapping the various populations carefully, we find that here, as in the case of other species in the same region, we have a single variable group which, living in isolated limestone habitats of varying size and of varying ecological conditions, has developed populations of different color, shell size, and shape. Viewed on a range-wide scale, these populations do not easily permit taxonomic separation.

The limits of variation are interesting. In size the shells vary from 10.7×7.7 mm in Sierra La Cumbre near the eastern end of the range of *chrysochasma* to 6.9×4.7 mm at Las Delicias, near the center of the range. At Rangel, the type-locality, the shells range from 9.3×6.8 to 8.6×6.1 mm, a difference which might involve secondary sexual characteristics. It must not be thought that the size variations follow any distinct geographical pattern. Populations of comparatively large shells (Sierra del Abra, 10.5×7.7 mm) live not far from populations of considerably smaller individuals (Las Delicias, 6.9×4.7 mm). Similarly, the population of Mina Constancia (10.2×6.6 mm) is near the Laguna de Piedras (7.9×5.9 mm), yet the difference in shell size is striking. Populations of large shells (San Diego de los Baños, 10.1×5.8 mm; Sierra Infierno, 10.8×6.7 mm; Galalón, 9.8×6.5 mm) alternate with populations of small shells (Costanera de San Vicente, 6.8×4.7 mm; Cuajaní, 7.4×4.8 mm). Populations of intermediate size (La Jagua, 8.6×6.5; Sierra Paso Real, 9.4×6.1; La Güira de San Diego, 8.9×5.4) are scattered from one end of the range to the other. Even in single localities with different microhabitats, populations may differ in size: shells from the lower reaches of Sierra Infierno are 10.8×6.7, but shells from near the peak (cima) are 8.8×6.4.

The color, generally confined to the aperture and the earlier post-nuclear whorls, shows similar considerable but

apparently random variations. The color varies from a rather bright orange, through yellowish and pale orange, to bright and finally very faint yellow and white. Shells with bright orange color are found at Galalón and La Cumbre in the region of San Andrés near the eastern limits of the range, as well as in Constancia, Capón, and Puertecitas near Viñales, the center. Yellowish orange is found at Paso Real in the west, Sierra Quemado, near the center, and at San Diego de los Baños in the east; yellow is found at Mendoza and La Muralla in the west, Cuajaní in the center, and Rangel in the east.

The color of the apex is also variable. In several populations (Cejanal, Sierra del Infierno, Sierra La Cumbre, Puertecitas, El Queque) it is white; in other localities it varies, as does the color of the aperture. Frequently the apical color, though generally paler, more or less resembles the color of the aperture in the same specimen. In some areas, however, it varies as in Sierra de la Cumbre, where the apex is white but the aperture brightly colored.

In spite of all this, the shells of the species as a whole are not hard to recognize. The strong shell, the glossy texture, the high, acutely conic shape, the rounded carinate periphery, the presence, generally, of color surrounding the aperture, sometimes appearing also at the apex, and the localization of the species in the Sierra de los Organos and adjacent hills always betray the true identity.

Pfeiffer separated *jucunda* from *chrysochasma* on the basis of a rounded body whorl ("ohne eine Spur von Winkel."). An examination of a large number of series shows this to be a variable characteristic, intergrading from moderately carinate to smoothly rounded forms. Hence taxonomic separation is not feasible.

Shells which lack the columellar coloration were called *jaumei* by Clench & Aguayo. The columellar spot of color is highly variable in shade and in intensity. Specimens without any sign of this color fit into the range of variation. It is significant that such shells vary in no other respect. Moreover, in addition to the "type-locality" (San Andrés), shells with a white parietal or columellar area are found also at Costanera de San Vicente, a good distance away. It is clear that this is a population characteristic which appears at random and apparently has no taxonomic significance.

The names *hernandezi* Wagner 1908 and *mendozana* Pilsbry 1928 were given to races of small shells from Viñales and Mendoza respectively. We have series of shells of similar size from Las Delicias and Costanera in Viñales, and Los Portales and La Muralla in Guane. These series not only have a wax yellow color at the aperture but also vary, as do typical *chrysochasma*. The small size is rather constant, about 6 mm in height, but the population at La Muralla is larger, about 8 mm and hence serves as the transition to the normal size of *chrysochasma*. Because of the scattered occurrence of these small forms, we assume that here we are dealing with dwarfed forms affected by some factor in their environment. We found similarly dwarfed forms of *Viana regina* (Morelet) in small, isolated mogotes in the same region (Clench & Jacobson, 1968: 11).

Troschelviana chrysochasma ranges from Mendoza near Guane in the west to the region of San Diego de los Baños in the east. It is most strongly distributed throughout the region of Viñales, which might be considered the center of its range (Pl. 6). There are fewer records as both limits of its range are reached. The complete lack of any records from the area around Luis Lazo is surprising, since the species is represented both to the west (Guane) and east (Viñales) of this region. Here it is replaced by *C. jugulata* Poey (Pl. 6). (See under *acuminata*.) We have a single small series of shells from Sierra Quemado near Isabel María immediately

to the northeast of Luis Lazo, but none nearer.

This species is one of the numerous groups of Cuban helicinids that are strictly confined to the calcareous hills of the Sierra de los Organos. However, we have been unable to find any field notes that would give us more data on its ecological preferences.

Specimens examined. Pinar del Río Province. *Guane:* Sierra Paso Real; Cueva del Catre, Sierra Paso Real; Pedrera de Mendoza; La Cantera, Mendoza; *Isabel María:* Sierra Quemado. *San Vicente:* Sierra La Chorrera; Ensenada de la Catuna, La Chorrera; Ensenada Miranda; Hoyo de la Fania; Costanera de San Vicente; Punta de la Costanera de San Vincente; Central Mogote, El Cao, Mogote de Mongo Cruz, Mogote Grande de los Cabrera (all Laguna de Piedras). *Viñales:* Ancón; mogote near Ancón; El Abra; Sierra de Galeras, El Abra; La Guasasa; Mogote Capón; Mogote del Refugio; Bermejales; Mogote de la Mina Constancia; Mogote Coco Solo; Mogote de la Dinamita; Mogote de los López; Mogote del Marmol; Mogote de Lorenzo López; Mogote de José María García; Mogote Palmarito; Mogote Santoro, Cuajaní; Mogote Abascar, Cuajaní; Pedregal de Vega Larga; Sierra Cejanal; Sierra Serrucho; Sierra del Infierno; Hoyo de los Cimarrones, Sierra del Infierno; Sierra Cejanal; Puertecitas; Cueva del Agua; Las Delicias; Hato Morales; Hoyo del Majá; Hoyo de Jaruco. *Consolación del Norte:* Mogote de Vegas Nuevas; Hoyo Corto de San Antonio, La Jagua; Mogote de Pastor Rivera; Cueva del Abono, Galalón, San Andrés. Guajaibón (*jucunda* Pfeiffer). *Rangel:* El Retiro; Paredones del Río Taco Taco. *San Diego de los Baños:* Sierra de la Cumbre; Mogote Colorado; La Catalina (*jucunda* Pfeiffer); Mogote near Finca de Cortino; Mogote Herrera; La Güira.

Troschelviana (Troschelviana) jugulata (Poey)

Plate 2, figures 1–2

Helicina jugulata Poey 1858, Memorias Historia Natural Isla de Cuba, 2: 34, pl. 4, figs. 3–4 (type-locality, Guane; lectotype, here selected, MCZ 73780, Anthony Collection ex Poey; paralectotype, same data, MCZ 262651).

Helicina jugulata Poey. Pfeiffer 1858, Monographia Pneumonopomorum Viventium, Suppl. 1, p. 196.

Helicina jugulata Poey. Sowerby 1866, Thes. Conchyl., 3: 284, pl. 270, figs. 154–156.

Helicina jugulata Poey. Pfeiffer 1862, Novitates Conchologicae, 2: 203, pl. 53, figs. 16–19.

Helicina jugulata Poey. Arango 1879, Contribución Fauna Malacológica Cubana, p. 51.

Eutrochatella (*Ustronia*) *jugulata* Poey. Wagner 1908, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 2, p. 127, pl. 25, figs. 1–2.

Eutrochatella (*Troschelviana*) *jugulata* (Poey). H. B. Baker 1922, Proc. Acad. Nat. Sci. Philadelphia, 74: 59.

Helicina jujulata Poey. Paetel 1889, Catalog der Conchylien-Sammlung, Berlin, 4th ed., pt. 2, p. 496, error for *jugulata*.

Helicina jujularis Poey. *Op. cit.*, p. 496, error for *jugulata*, nude name.

Description. Shell reaching about 15 mm in height, elevated conic, moderately strong, shining. Color of upper whorls light reddish brown merging gradually into rufous-tinged bluish white, orange, or yellow in the lower whorls with a paler subsutural band on the last whorl; parietal region with a gleaming, dark reddish brown spot. Whorls 8, barely convex, body whorl inflated, not descending at aperture, with an obtuse keel in earlier portion; keel sharp in juvenile specimens. Suture moderately impressed. Spire steep, elevated conic, apex acute, raised. Aperture capacious, width equal to height, pale yellow within, outer edge evenly rounded. Parietal wall smooth with a gleaming, barely raised, dark reddish brown callus, entering shortly into the aperture, unevenly rounded at outer margin. Palatal lip thin, flaring centrally, narrow and barely flaring above, reflected only briefly at insertion into columella where it forms a small, elongate, low tubercle. Columella unevenly convex,

more so below, with a subacute angle at insertion into basal lip. Sculpture faint, composed of fine diagonal growth lines. The wavy lineolations in the shell substance are rather wide, easily visible. Protoconch 1½ whorls, glassy, lighter than the early postnuclear whorls, sharply raised. Periostracum wanting, but shells occasionally encrusted with nonorganic matter, parietal area usually clean. Operculum same color as parietal callus; columella margin with a narrow, rounded ridge; palatal margin weakly twisted, thin.

Height mm	Width mm	
16.0	11.5	[Guane] (lectotype)
14.5	12.2	" (paralectotype)
12.5	10.5	Sierra de Guane
14.5	13.0	Sumidero
12.0	9.5	La Muralla
11.5	9.0	Sierra San Carlos, Luis Lazo
13.0	10.5	Los Portales

Remarks. The lectotype has a light colored spire but the faint rufous-tinged bluish white color of the later whorls is very distinct. The shell color throughout the range of the species is variable, some specimens having pale orange shells while other populations or individual specimens have a strong yellow tinge.

The shells of this species are easily identified by their widely conical shape, medium-large size, rather thin texture, flaring lip and the brilliant parietal blotch. The species is limited to the western portions of the Sierra de los Organos complex, from Mendoza to Cabezas. In the area between Luis Lazo and Sierra Quemado it has displaced both *Ustronia acuminata* (Poey) and *Troschelviana chrysochasma* (Poey) (Pl. 6).

Specimens examined. Pinar del Río. *Guane:* Sierra de Guane; W of Sierra de Guane; Cueva del Agua, Cueva del Catre, (both Sierra de Guane); Sierra Paso Real; Pedrera de Mendoza; Los Portales; Cueva Oscura; Punta de la Sierra; La Muralla. *Luis Lazo:* Sierra de San Carlos; Sabanas Llanas, Sierra de San Carlos; Ensenada del Sijú, Sierra de San Carlos; La Estrechura; El Potrero (=Valle de San Carlos); Las Vírgenes, El Potrero; Farallon del Resolladero, El Potrero; Mogote Los Arenales, Sumidero; Pica Pica, Sumidero. *Cabezas:* Mogote del Valle; Kilometer 68 on road to Pinar del Río; Ensenada de los Burros.

Troschelviana (Troschelviana) mestrei (Arango)

Plate 4, figure 16

Helicina mestrei Arango 1879, Contribución Fauna Malacológica Cubana, p. 133 (type-locality, Bebedero in Pinar del Río partis occidentalis; type, MP?).

Helicina mestrei Arango. Crosse 1890, Jour. de Conchyl., 38: 313, pl. 6, figs. 6, 6a, 6b.

Eutrochatella (*Ustronia*) *mestrei* Arango. Wagner 1908, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 2, p. 129, pl. 25, figs. 10–11.

Eutrochatella (*Troschelviana*) *mestrei* (Arango). H. B. Baker 1922, Proc. Acad. Nat. Sci. Philadelphia, 74: 60.

Description. Shell about 6 mm in height, high conic, moderately shining, subcarinate basally, rather thin. Color yellowish green, apex yellowish, lip white, with a white band at base of body whorl. Whorls 6½, rather flat, body whorl carinate, not descending at aperture; base weakly inflated, shallowly concave in umbilical region. Suture weakly impressed. Spire rather narrowly conic, acute. Aperture oblique, widely semilunate, greenish yellow within, lip white. Parietal wall shining, parietal callus glassy, slightly raised, irregularly rounded at outer margin. Lip weakly flaring but not reflected, widest at center, narrowing at both terminations, with a rounded, low tubercle at basal insertion. Columella short, deeply concave, weakly sigmoid above. Sculpture of the last three whorls of diagonal, very weak, wavy axial lines which become weakly sigmoid on the body whorl. Protoconch 1½ whorls, yellowish, somewhat darker than the rest of the shell, regularly minutely punctate. Periostracum wanting,

but occasional specimens have a pseudoperiostracum of amorphous inorganic matter. Operculum as in genus, thin, corneous, somewhat darker in color than the rest of the shell.

Height mm	Width mm	
5.8	4.5	Mogote El Arabo
6.3	4.8	Mogote Cerro de Cabras
6.0	5.0	"

Remarks. This species is apparently confined to a few localities south of the Sierra Viñales complex of mountain ranges (Pl. 8). However, its small size may have caused it to be overlooked, and more intensive collecting may prove that it has a larger range.

Arango (1879: 134) compared it to *Helicina chrysochasma*, but *mestrei* is smaller, and lacks the color spot at the umbilical region. The axial lineolations appear also in *T. alboviridis* (Pfeiffer), but the shells of this species are considerably smaller and less sharply carinate than *mestrei* and have a dark instead of white basal band.

We have been unable to locate Mogote El Arabo on any map; it probably is a small mogote not far from Pinar del Río City, near Bebedero, the type-locality of the species.

Although we were unable to examine any type-material, there is little doubt about the identity of this species, largely because of the excellent illustrations in Crosse (1890).

Specimens examined. Pinar del Río. Mogote El Arabo; Mogote del Cerro de Cabras; La Güira de Lagumeda.

Key to the Species of Subgenus *CUBAVIANA*

1. Shell with a variously acute basal carina, base flattened ..... *pyramidalis*
1. Shell with rounded basal carina, base somewhat inflated 2
2. Shell with yellow or orange aperture and/or columellar blotch; in Pinar del Río ..... *rubromarginata*
2. Shell with aperture same color as the rest of shell; in Isle of Pines ..... *scopulorum*

Subgenus *Cubaviana* H. B. Baker

Cubaviana H. B. Baker 1922, Proc. Acad. Nat. Sci. Philadelphia, 74: 60 (type-species, *Helicina politula* Poey 1852, [=*H. pyramidalis* Sowerby 1842], original designation).

Description. Shell broadly conic, moderately elevated, smooth, with faint growth lines and relatively weak spiral lines. Radula cusped as in *Troschelviana s. s.*, but more weakly, the cusps of the T-lateral fewer and noticeably weaker.

Remarks. This section was set up by Baker to include the smooth *Eutrochatella*-like species of Cuba with lower shells and with less strongly cusped radular teeth. Spiral sculpture, though still weak, is more noticeable than in *Troschelviana s. s.* The shells generally are somewhat larger than those of *Troschelviana s. s.*

Troschelviana (Cubaviana) pyramidalis (Sowerby)
Plate 2, figures 7, 11

Helicina conica Orbigny 1842, Mollusques, *in* Sagra, Histoire Physique, Politique, et Naturelle de l'Ile de Cuba, Paris, 1: 249, pl. 20, figs. 7–9 (not fig. 10); [not Pfeiffer 1839] (type-locality, l'intérieur de l'île de Cuba; type, BM(NH) 1854.10.4.170).

Helicina pyramidalis Sowerby 1842, Thes. Conchyl., 1: 9, pl. 3, fig. 104; 1866, *op. cit.*, 3: 284, pl. 270, fig. 157.

Helicina straminea Morelet 1851, Testacea Novissima Insulae Cubanae et Americae Centralis, 2: 18 (type-locality, montes insulae Cubanae Guajaibon dictos; 3 syntypes, BM(NH) 1893. 2.4.1615–17).

Helicina politula Poey 1852, Memorias Historia Natural Isla de Cuba. 1: 113, pl. 5, figs. 4–6 (type-locality, la cordillera frente a Santa Cruz, en tierra de D. Francisco Adolfo Sauvalle; type, MP?).

Helicina exacuta Poey 1852, *op. cit.*, 1: 114, pl. 5, figs. 7–9 (type-locality, en las lomas de Cayajabos; type, MP?).

Eutrochatella (*Ustronia*) *pyramidalis percarinata* Wagner 1908, *in* Martini & Chemnitz, Conchyl.-Cab. (2) 1: sect. 18, pt. 2, p. 121, pl. 23, fig. 25 (type-locality, Rangel auf Cuba; type, IZW 8540).

Description. Shell 6 to 8 mm in height, broadly turbinate, moderately solid to rather thin, periphery sharply carinate, occasionally extremely so, base flat to moderately inflated, shell sublustrous. Color bluish white or yellowish, occasionally very faintly rufous-tinged, base greenish or greenish yellow, lustrous, frequently translucent, carina with a white band below, margined by a somewhat wider, glassy, olivaceous line; colored spot on columella wanting. Suture well impressed, occasionally subchanneled. Spire broadly conic, sides straight or faintly convex, apex sharpely raised, nipplelike. Aperture oblique, subrhomboid, outer angle acutely rounded, sometimes yellow internally. Parietal wall flat or moderately inflated, shallowly excavated in umbilical region, with a thin, gleaming parietal wash that extends shortly beyond the aperture, and with a low, curved, rounded lamella at the columellar insertion of the basal lip. Palatal lip weakly flaring, except at the extremities, set off from the body whorl by a shallow, rounded groove that runs along the base of the peritreme. Columella short, shallowly concave below, rounded convex above. Sculpture of diagonal growth lines, crossed by variously strong, regularly spaced spiral cords which are generally weaker or obsolescent on the body whorl and the base. Protoconch 1½ whorls, white, rounded, microscopically punctate, sharply raised. Periostracum wanting, but occasional specimens are encrusted with a thin layer of inorganic matter. Operculum as in genus, strongly punctate on the surface, outer layer glassy white, subtransparent in center; concentric growth lines unevenly spaced; columellar margin weakly twisted, armed with a raised, rounded lamella with a punctate surface; inner layer thin, light brown, barely darker at margins, extending beyond the edge of the calcareous layer.

Height mm	Width mm	
6.5	6.8	Rangel
6.0	7.1	Rancho Lucas, Guajaibón
6.2	7.3	Callajabos (Cayajabos)
6.8	7.2	Callajabos (Cayajabos)
7.6	7.6	Rangel
6.3	6.2	Santa Cruz de los Pinos, type-locality
6.2	6.0	El Retiro, Rangel

Remarks. The specimens we have examined indicate that the range of this species reaches from the region of Cayajabos near the Sierra del Rosaria and Bahía Honda westward to the Pan de Guajaibón and Rangel. In these latter two localities the range apparently overlaps that of *Troschelviana rubromarginata* (Pl. 6).

The shells of this species are easily recognized by the variously sharp peripheral carina, marked by a white band which below is margined by a subequal, olivaceous, generally subtranslucent line. The carina varies slightly in strength and in the prominence of the two color bands, but these are always prominent enough to identify the species.

Some populations of *rubromarginata* in the vicinity of Viñales (Kilometer 14 and El Cuajaní) have shells that are also carinate, but the keel is always less acute and is not marked by the two bands as in *pyramidalis*.

In addition to the presence of the keel, the present species differs from the neighboring *rubromarginata* in its lower and wider shape, its generally smaller size, its flatter whorls and in the consistent absence of the colored columellar spot.

There is little doubt in our minds that all the names listed in the synonymy refer to the same species. When attempting to distinguish their species—in the few cases where the attempt was made—the various authors refer to such characters as shell color, the strength of the carina as well

as size, shape, and sculpture, all of which we find to be variable in this group.

Poey's *exacuta* is very sharply keeled, but it is not difficult to find specimens in which the keels are weaker and clearly intergrade with the weaker keel of typical *pyramidalis*. Poey (1852: 114) admitted that his form "tal vez no es más que una variedad de la *H. straminea* Morelet," distinguished by its smaller size (6 mm instead of 8) and the greenish rather than yellow color, both variable characteristics. Poey's *politula* has longitudinal striations confined to the upper whorls, a flattened base, a deep suture, all as in *pyramidalis*. It differs, according to Poey, in the swelling (hinchazón) of the last three whorls "which makes it appear more globulose when viewed from above" (translated). This characteristic seems to be associated with specimens which have a less sharply keeled carina and is of no diagnostic value. From the material available for this study, we are not able to judge whether the geographically separated populations are consistent in their variations or are composed of forms which show differing characteristics.

Specimens examined. Pinar del Río. El Taco; Las Animas; El Retiro (all Rangel); Guajaibón; Rancho Lucas, Guajaibón; El Mamey, Sierra del Rosario, Cayajabos; Quiñones, Bahía Honda; Santa Cruz de los Pinos; Ingenio Quiñones, Sierra de Guacamaya.

Troschelviana (Cubaviana) rubromarginata (Gundlach)

Plate 2, figures 3, 4, 5, 6, 10

Helicina rubromarginata Gundlach *in* Poey, 1858, Memorias Historia Natural Isla de Cuba, 2: 15, pl. 1, figs. 17–18 (as *Cylindrella* [*sic*]; type-locality, in monte Guajaibón insulae Cubae; lectotype, here selected, MCZ 90024, Guajaibón ex T. Bland Collection; paralectotypes, MCZ 273215, same.)

Helicina (Helicina) nodae Arango 1862, Jour. de Conchyl., 10: 409 (not *Helicina nodae* Sowerby 1866; type-locality, rupes prope Guane Cubae occidentalis; lectotype, here selected, MCZ 73781, Guane, ex Arango).

Helicina wrighti Pfeiffer 1863, Malak. Blät., 10: 195 (type-locality, Vignales in westlichen Theil von Cuba; lectotype, here selected, MCZ 73865, ex Wright, J. G. Anthony Collection).

Helicina festa Gundlach *in* Sowerby 1866, Thes. Conchyl., 3: 284, pl. 270, figs. 152–153.

Helicina rubromarginata Gundlach, Pfeiffer 1858, Monographia Pneumonopomorum Viventium, suppl. 1, p. 213; Arango 1879, Contribución Fauna Malacológica Cubana, p. 56.

Eutrochatella (Ustronia) straminea rubromarginata (Gundlach) Poey. Wagner 1908, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 2, p. 122, pl. 23, figs. 22–23.

Eutrochatella (Ustronia) wrighti xanthacme Wagner 1908, *ibid.*, p. 119, pl. 24 (not 25), figs. 10–11 (type-locality, Guajaibón in Cuba; type, IZW, 8542).

Eutrochatella (Troschelviana) (sect. *Cubaviana*) *straminea rubromarginata* ("Gundlach" Poey). H. B. Baker 1922, Proc. Acad. Nat. Sci. Philadelphia, 74: 60.

Description. Shell reaching about 8 to 10 mm in height, raised turbinate, rather solid, sublustrous, generally obtusely carinate. Color generally white, occasionally with a faint bluish, yellowish or flesh-colored tinge and with a yellow or orange-yellow irregular spot in the columellar region. Whorls about 7, gently inflated, body whorl with a rounded carina, not descending at the aperture; the three earlier whorls strongly shouldered. Suture well impressed, channeled in the earlier whorls. Spire broadly conical, sides somewhat swollen, lending a bulbous appearance to the lower portion of the shell. Aperture oblique, roundly triangular, the palatal angle widely rounded, with a pale yellow or yellow-orange spot in the columellar region. Parietal wall moderately inflated, generally marked by the faint spiral cords as well as the axial growth lines, with a raised, lustrous, generally yellow or yellow-orange callus which is widest in the umbilical region. Palatal lip thin, entire, weakly flaring except at extremities, generally white, in occasional populations colored like the callus, shortly angled at columellar insertion. Columella almost perpendicular below, slightly swollen near base, obtusely angled at insertion

of basal lip. Sculpture of oblique, diagonal growth lines, crossed by spiral cords which are strongest on early postnuclear whorls, becoming weaker, occasionally obsolescent on body whorl and base. Protoconch $1\frac{1}{2}$ whorls, white, rounded, microscopically punctate, sharply raised. Periostracum wanting; shells occasionally encrusted with a thin, amorphous layer of inorganic matter. Operculum as in genus, subopaque, outer layer lustrous, minutely punctate. Internal chitinous layer thin, pale brown, darker marginally. Parietal margin twisted, with a low, rounded lamella, highest near dorsal end. Outer margin thin, slightly twisted.

Height mm	Width mm	
8.1	7.2	Guane, lectotype of *nodae*
7.6	6.8	La Furnia, Sierra La Güira
8.8	8.1	Sierra Galalón
9.0	7.4	Mogote Capón
10.7	9.6	Cayos de San Felipe
10.4	9.4	Viñales, lectotype of *wrighti*
8.0	7.2	Guajaibón, lectotype of *rubromarginata*
6.8	6.9	Guajaibón, paralectotype of *rubromarginata*

Remarks. This species ranges from Mendoza in the west to San Diego de los Baños in the east, but it appears to be absent from the large intervening area about Luis Lazo, Isabel María, and Cabezas (Pl. 6). In this way it almost duplicates the range of *Ustronia acuminata* and *Troschelviana chrysochasma* (q. v.). At the Pan de Guajaibón its range overlaps that of *T. pyramidalis* Sowerby.

The shells can be recognized by the rather high conic shape, the generally rounded periphery, the spiral cords occasionally covering the entire shell, and the colored spot in the columellar region. The shells of *Ustronia acuminata* (Poey) and its subspecies *columellaris* (Gundlach) are larger, generally less solid and less glossy, more depressed and wider in shape, and have less or no spiral sculpture. In addition most specimens of *rubromarginata* have a shallow, rounded groove along the outer palatal edge of the peritreme so that the flare of the lip appears to be stronger than in *acuminata*.

The shells vary in size, but this feature seems to be controlled by ecological forces on whose nature we can only speculate, since populations of larger shells alternate indiscriminately with populations of small shells. Populations having shells with the yellow or orange-yellow columellar color and a colorless outer lip have been called *nodae*. We have specimens of such populations from Sierra La Güira, Pan de Guajaibón, San Diego de los Baños, and Mendoza. They are interspersed among populations of more typical *rubromarginata*. Moreover, in at least one population of *pyramidalis* (Sierra Guacamaya), some individuals show the *nodae* lip, whereas others do not. Thus it seems that this taxon refers to an unstable color variety that probably cannot survive interbreeding.

The color of the animals of several of the taxa discussed here were transmitted by Gundlach to Pfeiffer, who published them in 1856. Some variations were noted, but we have no way of knowing to what extent intra-population variations exist. It is known that in some marine prosobranchs (*Littorina, Thais*) as well as in some pulmonates (*Cepea*), the color of the animals of the same species and of a single population varies. Such variation is generally regarded to be of little taxonomic value.

Wagner (1908) and H. B. Baker (1922) considered the present taxon as a subspecies. We have decided to treat it as a full species. The differences between it and *pyramidalis* in size, shape, and color —especially the columellar color spot—are considerable. More important is the fact that there is an apparent overlap of forms at the Pan de Guajaibón. By definition subspecies must be allopatric, and we feel that this principle should be applied here.

Specimens examined. Pinar del Río. *Guane:* Mendoza. *Viñales:* El Queque; Ensenada del Valle, El Queque; Hoyo de

la Cidra, El Queque; cliff before Mogote Largo; Mogote Trujillo; E of Mogote Mamí; Mogote Vigil; Mogote de Justo; Kilometer 14; Cayos de San Felipe; Mogote Mina Constancia; Ensenada Miranda, Palamarito; La Guasasa; Mogote Capón; Conguita; Mogote de Coco Solo; Paso de Dolores; El Cuajaní. *Consolación del Norte:* Farallón de las Avispas; Arroyo Cueva del Chino (both Galalón); slopes of Pico Chico; Pico Chico; Canalete; Pico Grande; Pasada de la Ayúa (all San Andrés); Caiguanabo; Abra de Caiguanabo; Hoyo de San Antonio; Los Camarones, San Antonio; La Jagua; Mogote S of Galalón; La Furnia, Sierra La Güira; Pan de Guajaibón; Pinalito, W of Galalón. *San Diego de los Baños:* Mogote de La Tumba; Ensenada del Corojal (both Puerto Escondido); Mogotico Herrera; Mogote de los Portales; Mogote Cuatro Caminos; Sierra de la Cumbre.

Troschelviana (Cubaviana) scopulorum (Morelet)

Plate 3, figures 14–15

Helicina scopulorum Morelet 1849, Testacea Novissima Insulae Cubanae et Americae Centralis, 1: 20 (type-locality, insulam Pinorum; type, BM(NH) 1893. 2.4.1612.14).

Helicina scopulorum Morelet. Pfeiffer 1853, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 1, p. 72, pl. 10, figs. 21–23; Arango 1879, Contribución Fauna Malacológica Cubana, p. 54; Sowerby 1866, Thes. Conchyl., 3. 284, pl. 270, fig. 147.

Helicina luteopunctata Poey 1852, Memorias Historia Natural Isla de Cuba, 1: 115, pl. 5, figs. 10–12 (no locality; type, MP?).

Helicina luteoapicata Poey 1852, *op. cit.*, 1: 394 [emended name for *luteopunctata*].

Eutrochatella (Ustronia) scopulorum Morelet Wagner 1908, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 2, p. 120, pl. 24, figs. 16–18, 22–23.

Eutrochatella (Troschelviana) scopulorum (Morelet) sect. *Cubaviana,* H. B. Baker 1922, Proc. Acad. Nat. Sci. Philadelphia, 74: 60.

Description. Shell reaching about 7 mm in height, elevated trochoid, subcarinate when mature, strongly carinate when juvenile, moderately strong, sublustrous. Color wax-white, occasionally tinged with pale yellow or pale red, apex occasionally darker, lip white. Whorls 7¼, almost flat, earlier postnuclear whorls strongly shouldered, body whorl obtusely carinate, somewhat inflated basally, not descending at aperture. Suture well marked, especially so at early postnuclear whorls. Spire broadly conic, sides weakly convex, apex sharply raised. Aperture oblique, roundly triangular, palatal angle widely rounded, widest below the periphery, yellow or reddish within, white near palatal lip. Parietal wall weakly inflated, with a rather strong, white, triangular callus which is strongly reflected in the umbonal region, forming a pseudo-chink there. Palatal lip entire, weakly flaring and barely reflected basally, straight at columellar insertion. Columella concave, almost perpendicular below, gently curved at insertion with basal lip, separated from the parietal callus by a subacute, low lamella. Axial sculpture of diagonal, irregular growth lines crossed by weaker spiral ridges which become weaker and obsolescent on the body whorl. The wavy axial lineolations within the shell substance are readily visible. Protoconch 1½ whorls, white, rounded, minutely punctate, sharply raised. Periostracum wanting but shells occasionally encrusted with a thin, irregular layer of inorganic matter. Operculum thin, outer layer whitish, glassy, smooth, subtranslucent, columellar edge slightly twisted with an opaque-glassy, raised, punctate ridge near the columellar margin, highest near the base; inner layer thin, pale brownish, reaching beyond the margin of the outer layer.

Height mm	Width mm	
7.5	7.5	Sierra de Casas
7.9	7.8	Sierra Colombo
7.4	6.8	Sierra de Caballos
7.7	7.5	Sierra de Bibijagua
6.6	6.3	Sierra de San Juan de la Mar

Remarks. This species is confined to the Isle of Pines where apparently it occurs in

large numbers. We have seen specimens from the two large sierras, Casas and Caballos, as well as such smaller ones as Colombo, Bibijagua, and San Juan de la Mar. The specimens from the last locality are smaller. Most specimens in the series we examined were taken dead.

The shell differs from *conica* (Orbigny) in being lower and more widely conic, in having a lip that does not flare as widely or as flatly, and in showing a pseudo-chink as the result of the basal reflection of the parietal callus margin. In addition the axial sculpture is stronger and more regular. It differs from *rubromarginata* in being somewhat wider, less glossy, and more strongly sculptured, in the stronger and larger parietal callus, and in the lack of the colored columellar blotch.

Specimens examined. Isle of Pines. Sierra de Casas; Sierra Columbo (Columbus); Sierra de Caballos; Sierra de Bibijagua; Sierra de San Juan de la Mar.

Key to the Species of Subgenus *MICROVIANA*

1. Shell relatively large, generally more than 5 mm in width, occasionally reaching 8 to 11 mm 3
1. Shell smaller, less than 5 mm in width 2
2. Shell 3 to 4.5 mm in width 4
2. Shell quite small, less than 3 mm in width ..... *granulum*
3. Shell with simple lip ..... *hians*
3. Shell with flatly expanded lip ..... *petitiana*
4. Shell with upper whorls steplike 5
4. Shell with upper whorls rounded, not steplike 10
5. Operculum more or less smooth 6
5. Operculum with variously long spines on outer surface 9
6. Shell with strong lamella entering in upper angle of aperture ..... *callosa*
6. Shell with aperture unarmed 7
7. Shell with noticeable spiral cords ..... *rupestris*
7. Shell with spiral sculpture wanting 8
8. Shell glassy white or pale yellow ..... *pf. pfeifferiana*
8. Shell flesh colored ..... *pf. najazaensis*
9. Shell with upper angle of aperture entire ..... *holguinensis*
9. Shell with notch in upper angle of aperture ..... *spinopoma*
10. Spiral sculpture absent ..... *methfesseli*
10. Some spiral sculpture present 11
11. Shell with deeply channeled suture ..... *tumidula*
11. Shell with deep pit in umbilical region ..... *continua*

Subgenus *Microviana* H. B. Baker

Microviana H. B. Baker 1928, Occas. Pap. Mus. Zool., Univ. of Michigan, no. 193, p. 46 (type-species, *Helicina rupestris* Pfeiffer 1839, original designation).

Torreviana Aguayo 1943, Rev. Soc. Malac. 'Carlos de la Torre,' 1: 69 (type-species, *Eutrochatella spinopoma* Aguayo 1943, original designation).

Description. Shell small (4 to 5 mm in height), depressed to low trochoid; spiral sculpture present or wanting. Basal callus a raised, wide or narrow, rounded lamella; umbilical depression present. T-lateral tooth without cusps, centrals cusped as in *Troschelviana s. l.*

Remarks. Baker (1922: 61) referred to the subgenus *Artecallosa* Wagner (1908: 132) for the shell characteristics of this subgenus. The diagnostic shell characteristics are the "basal callus . . . reduced to a lamellar-like, rather raised thickening ("Der Basalcallus zumeist auf eine leistenförmige, ziemlich erhobene Verdickung reduziert."). Spiral sculpture is always present. To these shell characteristics Baker (*loc. cit.*) adds radular features which he found in *E. rupestris,* the type-species of *Microviana.* These show that this group stands between the group having strongly cusped radular teeth (especially the paired centrals and the T-laterals) of *Troschelviana* and the smooth teeth of *Eutrochatella s. s.*

Artecallosa Wagner 1908, type *Helicina chryseis* Tristram 1861 (=*H. microdina* Morelet 1851) by subsequent designation of Baker 1922, is a synonym of *Pyrgodomus* Crosse & Fischer 1893, type *Helicina chryseis* Tristram 1861, monotypy. Baker (1922: 60) placed *Helicina rupestris* Pfeiffer 1839 in *Pyrgodomus.* In 1928 (p. 46) he established *Microviana,* type-species *Helicina rupestris* Pfeiffer 1839, by original

designation, for the Cuban forms and wrote that *Pyrgodomus* apparently included only the type-species from the mainland, which lacks the unicuspid marginals of the Vianinae (=Vianini). It resembles the Vianini in its sexual apparatus.

The only difference between *Torreviana* Aguayo and *Microviana* H. B. Baker is the presence of spines or projecting papulae on the operculum. However, the strength of this type of opercular sculpture of helicinids varies; even in the case of the two species included in *Torreviana*, *holguinensis* has its opercular spines "menores y menos aguzados que en *E. spinipoma*" [sic] (*loc. cit.*). Moreover, Aguayo reported (1932: 31) that "The radula [of *holguinensis*] is quite similar to that of *E. rupestris*." *Troschelviana petitiana* Orbigny, in the adult stage, presents a very similar kind of operculum. This last species is not closely related to the species in *Torreviana*. In view of all this, it would be hard to maintain a division on the basis of this opercular characteristic alone.

Troschelviana (Microviana) rupestris (Pfeiffer)

Plate 4, figure 17

Helicina rupestris Pfeiffer 1839, Wiegmann's Arch. Naturgesch., 5th year, 1: 353 (type-locality, selected by A. Torre [1952: 18], El Fundador, Canímar, Matanzas; type destroyed).
Trochatella rupestris Pfeiffer 1850, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 1, p. 8, pl. 5, figs. 12–15.
Eutrochatella (*Artecallosa*) *rupestris* (Pfeiffer). Wagner 1908, *ibid.*, sect. 18, pt. 2, p. 134, pl. 22, figs. 13–14.
Helicina rupestris Pfeiffer. Sowerby 1842, Thes Conchyl., 1: 10, pl. 3, fig. 120.
Trochatella rupestris Pfeiffer. Sowerby 1866, *op cit.*, 3: 284 pl. 269, figs. 143–144.
Eutrochatella (*Pyrgodomus*) *rupestris* (Pfeiffer). H. B. Baker 1922, Proc. Acad. Nat. Sci. Philadelphia, 74: 61, pl. 6, fig. 28 [radula].

Description. Shell about 3 mm in diameter, width generally as great as or greater than height, depressed trochoid, imperforate, moderately thin, not shining. Color pale to lemon yellow, occasionally faintly rufous. Whorls 4½, flat, frequently raised, rounded steplike above the well-impressed suture. Body whorl with a rounded carina, slightly descending at aperture, base gently rounded. Aperture oblique, widely semilunate. Parietal callus reduced to a rounded lamella near the parietal lip. Palatal lip thin, entire, barely flaring near basal insertion. Umbilical area shallowly excavated. Columella concave, rounded. Sculpture of faint, irregular growth lines crossed by evenly spaced, low but much stronger spiral lines, more closely set on earlier whorls and at summit of body whorl. Protoconch 1½ whorls, sharply raised above succeeding whorls, minutely pitted, paler in color than the rest of the shell. Periostracum wanting but occasional specimens encrusted. Operculum concave, shining, translucent, outer surface with numerous irregularly placed pustules.

Height mm	Width mm	
2.5	3.1	El Fundador
2.8	3.4	Elena, El Palenque
3.0	3.2	San Miguel de los Baños
3.2	3.2	Jaruco
3.0	3.1	Mesa de Mariel

Remarks. This small species can be readily recognized by the depressed, trochoid shape, the steplike nature of the whorls, and the rather strong spiral sculpture. It inhabits the western third of the island from Guane, Pinar del Río Province, to Canímar, Matanzas (Pl. 7). The discontinuous records are doubtlessly due to the failure to see and collect such small individuals.

Specimens examined. Pinar del Río. Guane. Havana. Finca Almeida Pipian, Madruga; Managua; Sitio Perdido, Jaruco; Lomas de Camoa; La Portada; Mesa de Mariel; Peña Blanca, Sierra Anafe. Matanzas. El Fundador, Canímar; Elena, El Palenque; Ramona, El Palenque; El Palenque; Cueva El Negro, San Miguel de los Baños.

Troschelviana (Microviana) hians (Poey)
Plate 3, figures 1–9

Helicina hians Poey 1852, Memorias Historia Natural Isla de Cuba, 1: 113, pl. 5, figs. 1–3 (type-locality, las altas montañas de Trinidad [Las Villas, Cuba] Lavalée leg.; type, MP?).

Trochatella petrosa (Gundlach MS) Pfeiffer 1857, Malak. Blät., 4: 111 (type-locality, an Steinen und Felsen von San Juan Letran; type, MP ?); 1858, Monographia Pneumonopomorum Viventium, suppl. 1: 174.

Trochatella rubicunda (Gundlach MS) Pfeiffer 1857, Malak. Blät., 4: 111 (type-locality, Magua [Trinidad, Las Villas]; lectotype, here selected, MCZ 73880, ex Anthony, Gundlach leg.; not Pease 1868).

Trochatella capillacea Pfeiffer 1857, Malak. Blät., 4: 111 (type-locality, San Juan de Letrán [Las Villas]; lectotype, here selected, MCZ 47525, ex Anthony, cotype *fide* Torre); 1858, Monographia Pneumonopomorum Viventium, suppl. 1: 176.

Eutrochatella (Microviana) petrosa pilsbryi Aguayo & Jaume 1957, Mem. Soc. Cubana Hist. Nat., 23: 119, pl. 1, fig. 4 (type-locality, San José, Hornos de Cal, Sancti Spiritus, Provincia de Las Villas, Cuba; holotype, MP 13258).

Trochatella rubicunda Gundlach. Sowerby 1866, Thes. Conchyl., 3: 284, pl. 269: figs. 141–142.

Trochatella capillacea Gundlach. Sowerby 1866, *op. cit.*, p. 284, pl. 269, fig. 138.

Trochatella petrosa Gundlach. Sowerby 1866, *op. cit.*, p. 283, pl. 269, figs. 136–137.

Trochatella rubicunda Gundlach. Arango 1879, Contribución Fauna Malacológica Cubana, p. 43.

Eutrochatella (Artecallosa) rubicunda Pfeiffer. Wagner 1908, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 2, p. 133, pl. 22, figs. 8–9.

Eutrochatella (Artecallosa) petrosa Pfeiffer. Wagner 1908, *ibid.*, p. 134, pl. 22, figs. 10–12.

Eutrochatella (Microviana) alcaldei Aguayo & Jaume 1958, Mem. Soc. Cubana Hist. Nat., 24: 95, pl. 1, fig. 1 (type-locality, Monte del Pico, Cavilán, Provincia de las Villas, Cuba; holotype, MP 17431).

Eutrochatella (Microviana) petrosa boqueronensis Aguayo & Jaume 1958, *ibid.*, 24: 96, pl. 1, fig. 2 (type-locality, Boquerón de Jatibonico between Las Villas and Camagüey, Cuba; holotype, MP 17422).

Eutrochatella (Microviana) purioensis Aguayo & Jaume 1958, *ibid.*, 24: 97, pl. 1, fig. 4 (type-locality, El Purio, Calabazar de Sagua, Provincia de las Villas, Cuba; holotype, MP 17420).

Eutrochatella (Microviana) clenchi Aguayo & Jaume 1958, *ibid.*, 24: 98, pl. 1, fig. 3 (type-locality, Guabairo, Soledad, Cienfuegos, Provincia de las Villas; holotype, MP 17429).

Eutrochatella (Microviana) subangulata Aguayo & Jaume, 1958, *ibid.*, 24: 99, pl. 1, fig. 5 (type-locality, Loma Ternero, entre San Juan de los Yeras y Seibabo, Manicaragua, Provincia de las Villas, Cuba. Carlos de la Torre leg.; holotype, MP 17425).

Eutrochatella (Microviana) subangulata cienfuegosensis Aguayo & Jaume, 1958, *ibid.*, 24: 100 (type-locality, Limones, Soledad, Cienfuegos, Provincia de las Villas, Cuba; holotype, MP 17427).

Description. Shell varying from 4 to 8 mm in width, broadly depressed trochoid, moderately thin, variously bluntly carinate. Color varied, grayish yellow, yellowish green or pale to dark rufous, spire occasionally darker in color. Whorls $5\frac{1}{2}$ to 6, quite flat, shortly carinate above the impressed and somewhat inserted suture, body whorl with a variously blunt carina peripherally, rounded truncate or recurved at the insertion into the aperture where it descends gradually under the keel. Spire broadly turbinate, apex raised. Aperture widely triangular, almost straight above, rounded below. Parietal wall with a rather narrow, rounded callus, strongly punctate on the surface; parietal wash thin, shining, smaller in area than the aperture. Palatal lip whitish, simple, somewhat undulate above, thickened within, not flaring, with a narrow, blunt lamella at the point of basal insertion. Columella short, concave below, rounded convex above. Sculpture varied, smooth with only weak growth lines, or with growth lines crossed by variously strong spiral lirations, variously spaced. Protoconch $1\frac{1}{2}$ whorls, rounded, raised, minutely and regularly punctate. Periostracum wanting, but shells frequently encrusted with a layer of inorganic material. Operculum as in genus, outer calcareous layer strongly and regularly pustulose, interior layer thin, light brownish, darker at the margins.

Height mm	Width mm	
4.3	4.4	San Juan de Letrán (lectotype of *capillacca*)
4.1	4.1	Magua, Trinidad (lectotype of *rubicunda*)
5.1	5.2	Cayo Lucas
4.2	5.0	"
7.5	8.1	Guabairo, Soledad
4.8	5.0	½ mi. E of Guabairo, Soledad
6.1	6.2	San Juan de los Perros, Camagüey
6.0	6.3	La Vigía, Mayajigua
6.0	5.5	Hornos de Cal, Sancti Spiritus
7.0	8.0	Boquerón de Jatibonico, Camagüey
5.8	5.8	Loma La Canterilla, San Juan de Los Yeras
5.2	6.0	La Viruela, Calabazar de Sagua
6.7	7.2	El Purio, Calabazar de Sagua
7.6	8.0	Palma de los Negros, Mayajigua
6.4	6.6	" "

Remarks. This is a polymorphic species which occupies the entire eastern half of Las Villas Province, running slightly beyond the borders into neighboring Camagüey Province (Pl. 7). This area is mountainous and of such a nature that the extreme isolation of populations such as is found, for example, in Pinar del Río Province, does not exist. Hence, the populations vary within themselves and frequently with other populations, the result perhaps of ecological forces that are not clear. Some apparent genotypic characters also occur, such as the sharpness of the peripheral keel and the presence or absence of spiral lirations. This last detail, in point of fact, seems to demonstrate the lack of isolation, since in at least one population (Boquerón de Jatibonico, Camagüey) both lirate and smooth individuals occur together with many intergrading. Where lirations do occur, they vary from quite weak to strong. The intervals between the lirations also vary, some individuals having the lirations much more closely spaced than others, and in some cases so closely spaced that the intervals equal the width of the lirations (MCZ 127629). Lirate and smooth populations live in close proximity and in general show an irregular geographic distribution. Aguayo (1962: 10–11) writes that shells which are strongly sculptured may show an ecological adaptation to a dry, sunny, rocky situation, whereas those in more shady areas presumably are smoother.

Size variations likewise do not show a distributional pattern and seem to be strongly affected by unknown ecological factors. Several populations of larger shells occur at Jatibonico toward the northeastern limit of the species range, but several series of shells from Soledad, near the southwestern limit contain individuals just as large in size. At Guabairo, for example, the population is quite large (7.5×8.1 mm) but nearby, one-half mile to the east, the more normal size (4.8×5.0 mm) prevails. Large shells are also found at Mayajigua (7.6×8.0 mm) far to the east, with many intervening populations of small shells.

Color presents similar variations. The shells vary from grayish white to pale and somewhat deeper yellow on the one hand and light to dark rufous on the other. In some individuals the lower whorls and the apex have a deeper color, the rest of the shell being paler. Sometimes the color is more or less uniform in a single population (Cayo Lucas, La Viruela, Lomas Castellanos), in other cases there is much variety with varying degrees of intergrading (Loma Esperanza).

Aguayo & Jaume (1957, 1958) proposed names for several of these populations. In addition, lots have been sent out widely under manuscript names. The name *E. subangulata* Aguayo & Jaume and its subspecies *cienfuegosensis* was applied to juvenile specimens which are sharply carinate and occasionally show a secondary more or less rounded carina near the base. Some of the populations so named apparently consist entirely of such juvenile forms and may well represent colonies of phenotypic paedomorphs.

The names *rubicunda* and *capillacea* were proposed by Pfeiffer for populations of small shells. It was early realized that

both were synonymous, and, except for size, indistinguishable from the usual *hians*. Wagner (1908: 134) noted the resemblence of *rubicunda* to *petrosa*. He wrote, "Eutrochatella petrosa hat das Aussehen einer unausgewachsenen, aber grösser angelegten Eutrochatella rubicunda Pfeiffer und stellt nach meiner Ansicht eine Geschlechtsform derselben dar." It should be noted that whereas many populations show a marked uniformity of size, in others (Palma de los Negros) the difference is greater. In the description of *Trochatella petrosa*, one of Pfeiffer's distinctions was of color—"lutea"—where Poey wrote of *hians* "rosado en la última vuelta, amarillo un poco sucio en las otras, con el ápice de un canario pálido muy puro" (1851: 113). We have already seen that color is not a characteristic of specific value.

Aguayo and Jaume (1957: 119) gave the name *pilsbryi* to a population near Sancti Spiritus having shells with the operculum "hundido en el interior de la abertura, mientras en *E*[*utrochatella*] *petrosa petrosa* de Magua, Trinidad se encuentra a ras del borde." Now it happens that Magua, Trinidad, is the type-locality of *Trochatella rubicunda*, selected by Pfeiffer himself. The lectotype in the MCZ has the operculum very much "hundido en la abertura." It would appear that *hians* normally keeps its operculum near the rim of the aperture but in exceptional cases—the nature of which we can only guess—draws it in further. In this respect it does not resemble *Troschelviana holguinensis* Aguayo and *Semitrochatella elongata* (Orbigny) where the operculum, being bigger than the aperture, is not retractable. The other features which are to serve to distinguish *pilsbryi*, such as size, sculpture, and color, are variable, as we have seen. It is interesting to note that in the type-lot of *pilsbryi* itself, as reported by the authors, the color varies from generally yellow to a few rosy ("rosado") individuals.

Viewed from the inside of the aperture, the palatal lip of *T. hians* seems to be flaring. This effect is caused by the bevelled lip being somewhat thickened within and sloping more or less gradually toward the thinned edge. Viewed from the outer surface the shell rarely shows a barely perceptible sign of flaring.

It is surprising that the true nature of *hians* Poey 1852 has been overlooked for such a long time. Pfeiffer (1854: 101) redescribed the species in Latin and later (1858: 174–176) repeated the description and also proposed *petrosa, rubicunda,* and *capillacea*. For some reason he changed Poey's description of the palatal lip from "perístoma simple, cortante" (1852: 114) to "perist. expansum" (1854: 101; 1858: 175). This resulted in confusion so that Sowerby (1866: 296) was unable to identify *hians*. Reeve (1874) omitted it entirely, as did Wagner (1908). Nor was it noted by Fulton (1915) in his list of omissions from Wagner's monograph. Arango (1879: 44) and Crosse[1] (1890: 310) merely listed it together with *petrosa* and *rubicunda*, giving the identical locality cited by Poey, thus showing that the supposed *hians* as described by Pfeiffer had not been found again.

This situation may also have come about because Poey's figures are somewhat misleading: they show a thickened lip, definitely not "cortante" as Poey put it in his description, and the carina is more rounded than is common in *hians* (=*petrosa*). The figures, moreover, are quite generalized and can scarcely be distinguished from the figures of *politula, exacuta, luteopunctata,* and *acuminata* given on the same plate.

Aguayo & Jaume (1957: 119) were the first, as far as could be determined, who called attention to *hians* in recent times. They tried to distinguish it from their subspecies *petrosa pilsbryi* but did not compare *hians* with *petrosa petrosa*.

[1] Crosse's great contribution lies in the magnificent figures of several Cuban species. Otherwise much of his paper is a translation of Arango (1878–80).

Although we have been unable to examine the type or to see any specimens labeled *hians*, we feel that there is no doubt about what Poey had in mind. The locality, the dimensions, the sculpture, the apex, the obtuse carina of the body whorl, the simple, sharp ("cortante") peristome, and the blunt, recurved truncation of the body whorl at the apertural insertion ("volteado") all point to what has been hitherto known as *petrosa* Pfeiffer.

Specimens examined. Las Villas. *Soledad:* Guabairo; ½ mi. E of Guabairo; Dolores Potrero, ½ mi. E of RR to Guabairo; Vilche's Potrero, 2½ mi. E of Soledad; Vilches Caves; Finca La Caldera, opposite Vilche's Caves; La Portuguesa, Seboruco, 2 mi. NE of Soledad; Limones, Seboruco, 1 mi. SE of Soledad; Seboruco, near Guaos, 2 mi. N of Soledad; Galdó near Santa Teresa; ½ mi. W of La Vega; Santa Tecla, Corralillo [6½ km from Soledad]; Quesada, 3 mi. S of Soledad; Monte de la Veguita; Harvard House. *Vega Alta:* El Guajén; Loma Sola, El Guajén; La Sierra; Mogote Chicharrón, La Sierra; Potrero Penton, La Sierra; Mogote Solo, La Sierra; Loma Murcielagos; La Sinaloa; Rincón; El Hoyón; Mogote between Vega Alta and Piedras. *Sagua la Grande:* Las Delicias; La Rubia; Central Ramona; El Mamey; Cueva La Virgen, Corazón de Jesús; San Miguel; San Francisco. *Calabazar de Sagua:* Mogote Ortiz; Cueva Galona; Mogote El Infierno, Natalia; Loma Castellanos, Natalia; La Viruela; Las Jumaguas; El Purio. *San Juan de los Yeras:* Loma del Ternero; Loma La Canterilla; El Miradero, San Diego del Valle. *Trinidad:* Magua; La Vigía; Loma Palo Seco, Yaguanabo. *Remedios:* Bartolomé; Rojas; Buenavista; Las Dos Sierras, Buenavista; La Culebra, Buenavista; Guajabana; La Puntilla; near La Puntilla; El Palenque de Taguayabón; Finca Las Marías, Palenque de Taguayabón; Finca El Mamey. *Zulueta:* Cueva de Las Veinte; San Augustín; Mogote near San Augustín; Guanijibe; Loma Ramón Martínez; El Boquerón; Charco Majá. *Sancti Spiritus:* Pedrera de Acosta; San José; La Esperanza; Loma La Esperanza; Hornos de Cal; Finca Bermúdez, Tuinicú; Finca San Vicente, Iguará; Siguaney; Loma Grande; Loma Gabino Galvez. *Yaguajay:* Urbaza; Muguirre; Cañón del Yigre; Guainabo; Cambao; Vereda del Resbalillo, Cambao; Pie Valdez; Vereda Herrera. *Mayajigua:* Los Baños; Rosa Perdida; Palma de Los Negros. *Caibarién:* Cayo Salinas; Cayo Lucas; Cayo Caguanes; Punta Caguanes. *San Juan de Letrán:* Loma Colorado, Vueltas; between km 42 and 43, Sierra de Meneses. Camagüey. Sierra de los Perros; La Espinosa, Chambas; Florencia, near Chambas; Iguará, Jatibonico; Finca Santa Felicia, Iguará, Jatibonico; Sierra del Boquerón de Jatibonico; Loma Marín, Jatibonico.

Troschelviana (Microviana) petitiana (Orbigny)

Plate 2, figures 12–13

Helicina petitiana Orbigny 1842, Mollusques, *in* Sagra, Histoire Physique, Politique et Naturelle de l'Ile de Cuba, 1: 247, pl. 20, figs. 1–3 (type-locality, Jagua, île de Cuba; type not in BM(NH), location unknown).

Helicina petitiana Orbigny. Pfeiffer 1850, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 1, p. 43, pl. 7, figs. 30–32.

Trochatella petitiana Orbigny. Pfeiffer 1852, Monographia Pneumonopomorum Viventium, 1: 331.

Helicina dilatata Poey 1857, Memorias Historia Natural Isla de Cuba, 2: 26 (type-locality, Trinidad; type, MP ?).

Trochatella petitiana Orbigny. Sowerby 1866, Thes. Conchyl., 3: 283, pl. 269, figs. 132–133.

Trochatella petitiana Orbigny. Arango 1879, Contribución Fauna Malacológica Cubana, p. 43.

Eutrochatella (*Artecallosa*) *petitiana* d'Orbigny. Wagner 1908, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 2, p. 132, pl. 22, figs. 4–7.

Eutrochatella (*Artecallosa*) *petitiana laticosta* Wagner 1908, *op. cit.*, p. 133, pl. 22, fig. 12 (type-locality, die Insel Cuba; type, IZW 8572).

Description. Shell varying in width from about 6 to about 13 mm, widely depressed conic, moderately shining or dull, thin.

Color generally white to pale yellow, occasional specimens pale reddish, lip white. Whorls from $5\frac{1}{2}$ to $7\frac{1}{2}$, narrowly shelved, moderately rounded or more or less sharply carinate, the carina not reaching the area of the palatal lip; body whorl about equal to the spire in width, not descending, or else gently rising at the aperture. Suture well impressed. Spire depressed conic, apex sharply raised. Aperture subtriangular, outer angle widely rounded, yellow or reddish internally with a narrow white zone near the palatal lip. Parietal wall somewhat inflated, shallowly excavated in umbilical region; at the columella there is a low triangular callus, with a strongly punctate surface. Palatal lip widely flaring but not reflected, occasionally gently undulate, widest above, narrower below the periphery, fluted in larger specimens, almost alate at the upper and basal insertions. Columella oblique, scarcely concave below, moderately convex above, set off from the umbilical excavation and the punctate callus by a low, rounded lamella. Spiral sculpture of varying strength, generally somewhat weaker on the base. Axial sculpture of diagonal, irregular growth lines which sometimes lend a wavy appearance to the spiral lines where they cross. Protoconch $1\frac{1}{2}$ whorls, rounded, closely punctate, sharply raised. Periostracum wanting. Calcareous plate of the operculum of mature individuals thickly set with low, blunt, glassy papillae, smaller and more thickly set than in *holguinensis* Aguayo and *spinopoma* Aguayo. Inner chitinous layer thin, set off by a deep marginal sulcus from the outer layer, darker at palatal margin where it extends beyond the calcareous layer.

Height mm	Width mm	
7.2	8.0	San José, Las Villas
11.6	13.3	Buenos Aires near Soledad
7.0	7.9	Naranjo Dulce
6.3	6.9	Mina Carlota
10.2	11.9	Ciegos de Ponciano
8.5	10.0	El Jarico, Banao, Sancti Spiritus

Remarks. This species is limited to a broadly triangular area whose angles are formed by Cienfuegos, Trinidad, and Sancti Spiritus in the south central part of Las Villas Province (Pl. 7). In this rather limited area ($40 \times 36 \times 70$ mi.) the shells display an astonishing amount of variation, the most apparent of which is in size. The largest shells are found at Buenos Aires near Soledad, and Ciegos de Ponciano near Trinidad, the smallest at Naranjo Dulce and Mina Carlota. (See measurements above.) Medium sized shells occur at San José and Sancti Spiritus. It is difficult to discern any distributional pattern among the various populations. It seems that the smallest shells appear in the western part of the range about Cienfuegos and the larger ones in the center and the west. Nevertheless, shells of moderate size appear in Moscas, which is closer to Cienfuegos than Mina Carlota. The shells from the type-locality, presumably Jagua at the entrance to the Bay of Cienfuegos, are given as 10×11 mm by Orbigny, and $8 \times 12\frac{1}{2}$ mm by Pfeiffer (1852), rather large shells, making the concept of cline difficult to accept.

The periphery varies from very rounded at Buenos Aires to quite sharply keeled at Naranjo Dulce with moderately carinate specimens occurring at Mina Carlota and Ciegos de Ponciano. The color is generally subdued, but at Ciegos de Ponciano the yellow is somewhat deeper, and rather handsome rufous specimens make their appearance. The strength of the spiral sculpture also shows some variation, being strong at San José and Ciegos de Ponciano, and weak at Buenos Aires.

The subspecies *laticosta* Wagner falls well into the range of variations of *petitiana*. The description given by Wagner seems to relate to shells from Ciegos de Ponciano.

The operculum is unique in possessing a surface of rather closely set, low papillae, similar to *holguinensis* Aguayo and *spinopoma* Aguayo. In the present species the

papillae are lower and much more closely set. In submature specimens the papillae are lower and the surface seems to be merely pebbled; in very young individuals the operculum is smooth and glassy without a sign of surface sculpture. It is difficult to see how the animal can apply more sculpture to the outer surface of the operculum as it matures, but such seems to be the case.

Specimens examined. Las Villas. *Cienfuegos:* San José; Aguada de Carreño, Las Moscas; Naranjo Dulce, La Sierra; Loma Dividente, Buenos Aires; Buenos Aires; Mina Carlota, Sierra de San Juan; Loma Chivo, Sierra de San Juan; Tetas de Doña Tomasa, Sierra de San Juan; Loma Puerca, Sierra de San Juan. *Trinidad:* Ciegos de Ponciano; Los Cinco, Sierra de Ponciano; Puriales Plantation; Fuentes Claras. *Sancti Spiritus:* El Jarico, Banao.

Troschelviana (Microviana) holguinensis (Aguayo)

Plate 4, figures 7, 12

Eutrochatella (Pyrgodomus) holguinensis Aguayo 1932, Occas. Pap. Boston Soc. Nat. Hist., 8: 31, pl. 3, figs. A, B (type-locality, Cerro Ramón Leyva, Sao Arriba, Holguín, Eastern Cuba [Oriente]; holotype, MCZ 86474; paratypes, MCZ 86475; also MCZ 86493, Las Cuevas).

Description. Shell about 3 mm in diameter, wider than high, depressed trochoid, thin, not shining, roundly carinate. Color pale brown or pale yellow. Whorls 5½, moderately inflated, raised, rounded step-like above the deeply inset suture, body whorl roundly carinate, descending slightly at aperture. Spire very broadly conic, apex raised. Aperture widely triangular, angles well rounded. Parietal wall shallowly excavated in umbilical area, parietal callus small, slightly raised, surface roughened by thickly set, low pustules. Palatal lip entire, not flaring, somewhat thickened at basal insertion. Columella short, shallowly concave. Axial sculpture of low, diagonal growth lines crossed by numerous, regularly spaced, slightly raised spiral cords, these cords more widely spaced on the later whorls. Protoconch 1½ whorls, glassy, minutely punctate. Periostracum wanting. Operculum widely triangular, larger than the aperture, not retractible into aperture; inner chitinous layer thin, pale brown, separated by a rather deep marginal sulcus from the outer calcareous layer; outer layer white, solid, strongly concave, the sloping sides with irregularly spaced, raised lamellae which become rather high, slanting, blunt papillae on the depressed inner surface.

Height mm	Width mm	
3.1	3.2	Cerro Ramón Leyva, holotype
3.0	3.3	Las Cuevas, paratype
3.0	3.1	Loma Pichín, El Yayal
2.9	3.0	Cerro Cariblanco

Remarks. The shells of this species strongly resemble *rupestris* Pfeiffer from the western end of the island in size, shape, color, and sculpture. They are readily separated, however, by the peculiar operculum. Aguayo (1932: 31) reports that the radulae are quite similar. Hence *holguinensis* may be regarded as the eastern homolog of *rupestris*. It is restricted to the area about Holguín in northwestern Oriente (Pl. 8), where Aguayo reports that it lives on limestone cliffs. The shells are frequently encrusted with a thick, irregular layer which Aguayo thinks is of fecal origin.

Specimens examined. Oriente. *Holguín:* Cerro Ramón Leyva, Sao Arriba; Cerro de la Cañada de Jagüeyes; Cerro Corralito, 17 km NE of Holguín; Las Cuevas; Loma Tino Pupo, 6 km N of Unas and 19 km NW of Holguín; Cerro Cariblanco, 16 km NE of Holguín; Loma Pichín, El Yayal. *Gibara:* Curva de la Campana.

Troschelviana (Microviana) methfesseli (Pfeiffer)

Plate 4, figures 4, 10

Trochatella methfesseli Pfeiffer 1862, Malak. Blät., 9: 8 (type-locality, Pflanzung Catalina,

Sagua de Tanamo [Oriente]; lectotype[1], here selected, MCZ 273216, Monte Toro, Guantánamo, ex Dohrn; paralectotype, *ibid.*, MCZ 86494); 1865, Monographia Pneumonopomorum Viventium, suppl. 2: 212.

Trochatella methfesseli Pfeiffer. Arango 1879, Contribución Fauna Malacológica Cubana, p. 43.

Eutrochatella (*Ustronia*) *methfesseli* Pfeiffer. Wagner 1908, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 2, p. 125, pl. 24, figs. 8–9.

Eutrochatella (*Cubaviana*) *methfesseli* Pfeiffer. H. B. Baker 1922, Proc. Acad. Nat. Sci. Philadelphia, 74: 60.

Description. Shell, reaching 4 mm in diameter, wider than high, turbinate, rather thin, moderately glossy. Color pale yellow or pale brown. Whorls 5½, rounded, body whorl not descending at aperture, rounded at periphery. Suture well impressed. Spire broadly conic, apex sharp. Aperture very oblique, widely semilunate; parietal wall rounded, shallowly excavated in umbilical region; callus a thin, narrow lamella. Outer lip entire, thickened at margin, not reflected or flaring, with a raised, triangular protuberance at basal insertion. Columella short, curved at insertion of basal lip. Sculpture of weak, diagonal growth lines only. Protoconch 1½ whorls, microscopically pitted, well rounded, raised over first postnuclear whorl. Periostracum wanting, but shell is frequently encrusted. Operculum with columellar edge weakly twisted, thin, horn colored; calcareous layer translucent, moderately shining, roughened by closely set minute pustules; chitinous layer glassy, extending beyond margin of calcareous layer.

Height mm	Width mm	
3.2	3.8	Monte Toro, lectotype
2.8	3.3	La Silla, Gibara

Remarks. The shells of this species resemble the group of *rupestris* in size and shape. They differ in having a rounded periphery, inflated whorls which do not present a steplike appearance, and by the absence or obsolescence of spiral sculpture. Pfeiffer wrote that it looks like a "miniaturform der *Tr. gouldiana.*" The records indicate that *methfesseli* has a wide distribution over the eastern three-quarters of Oriente (Pl. 8). The paucity of records is probably due to the diminutive size of the shell and its habit of encrusting its shell, both features causing it to be overlooked by collectors.

Specimens examined. Oriente. Baracoa; Monte Toro, Guantánamo.

Troschelviana (*Microviana*) *tumidula* (Clench & Aguayo)
Plate 4, figure 14

Eutrochatella (*Microviana*) *tumidula* Clench & Aguayo 1957, *in* Aguayo & Jaume, Mem. Soc. Cubana. Hist. Nat., 23: 119, pl. 1, fig. 6 (type-locality, Cerro de los Portales, Camayén, Barrio de Bariay, Gibara, Provincia de Oriente, Cuba; holotype, MP 13260; paratypes, MP 13261; MCZ 212978).

Description. Shell about 4 mm in height, depressed trochoid, thin, sublustrous. Color pale lemon-yellow or pale reddish brown, darker near the spire, aperture yellow or rufous internally. Whorls 5½, earlier postnuclear whorls roundly keeled, penultimate whorl shelved and slightly convex, body whorl inflated, periphery evenly rounded. Suture strongly impressed, subchanneled. Spire low, widely conic, apex well raised. Aperture oblique, semilunate, yellow or reddish within, with occasionally an uneven, yellowish orange band entering at the upper angle. Parietal wall somewhat inflated, microscopically and irregularly pebbled, with a low, marginally rounded, whitish, lamellate umbilical callus, thickest near the umbilical region. Palatal lip entire, simple, not expanded, roundly angled at point of columellar insertion. Columella evenly concave below, gently convex above, thickened, with a triangular protuberance where it merges with the

[1] The specimens referred to here were identified as cotypes (Gundlach leg.) by Dr. C. de la Torre in June 1912.

parietal callus. Sculpture of fine, irregular, diagonal growth lines; faint spiral cords limited to the first postnuclear whorl. Protoconch 1½ whorls, rounded, microscopically pebbled, raised. Periostracum wanting. Operculum thin, brown, glassy; surface microscopically pebbled and with a low, rounded lamella on the columellar margin.

Height mm	Width mm	
4.1	4.0	Silla de Gibara, paratype
4.0	3.6	Cerro San Juan, Sao Arriba
3.8	3.8	Portales de Camayén, Holguín
3.0	3.4	Cerro Cariblanco

Remarks. This species occurs in a restricted area in the region of Holguín and Gibara in the northwestern part of Oriente (Pl. 8). The shells can be recognized by their shape, which is more depressed and more rounded peripherally than its congeners of equal size. In addition, as Clench & Aguayo noted, the shells are distinctive in possessing a deep, almost channeled suture.

The shells show little variation throughout the range. The populations at Cerro Cariblanco and Portales de Camayén are somewhat smaller. In most of the series we examined, we found a mixture of rufous and yellowish individuals.

Specimens examined. ORIENTE. Sao Arriba; Cerro San Juan, Sao Arriba; Portales de Camayén (all Holguín); Cerro Cariblanco, 16 km NE of Holguín; Silla de Gibara.

Troschelviana (Microviana) continua (Pfeiffer)
Plate 5, figure 4

Helicina continua (Gundlach MS) Pfeiffer 1858, Malak. Blät., 5: 49 (type-locality, Guisa [Bayamo, Oriente]; lectotype, here selected, USNM 489514, Gundlach leg., ex Gill).

Helicina continua Gundlach. Poey 1858, Memorias Historia Natural Isla de Cuba, 2: 6.

Trochatella continua Gundlach. Pfeiffer 1865, Monographia Pneumonopomorum Viventium, suppl. 2: 212.

Trochatella continua Gundlach. Arango 1879, Contribución Fauna Malacológica Cubana, p. 44.

Eutrochatella (*Artecallosa*) *continua* (Gundlach MSS) Poey. Wagner 1908, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 2, p. 136, pl. 22, figs. 21–24.

Description. Shell about 4 mm in diameter, depressed trochoid, moderately thin, translucent, faintly lustrous. Color pale greenish yellow, lip somewhat lighter. Whorls 5, somewhat inflated, body whorl rounded carinate, not descending at aperture, suture well impressed. Spire low conic, apex raised. Aperture rounded trapezoid, acutely angled at upper columellar angle, same color as shell internally. Parietal wall weakly convex, with a deep, circular, subperpendicularly-sided pit adjacent to the columella; parietal callus thin, not projecting beyond the aperture. Palatal lip simple, barely flaring, straight at terminations, subtruncate at dorsal insertion in the body whorl. Columella short, shallowly concave below, set off from the basal pit by a low lamella. Sculpture of fine, irregular, diagonal growth lines, crossed by very faint spiral cords which are a reflection of the periostracal sculpture. Protoconch 1½ whorls, rounded, moderately raised, closely and microscopically punctate. Periostracum thin, deciduous, marked by low, widely spaced spiral ridges; shell usually encrusted. Operculum irregularly trapezoid, weakly concave, outer layer translucent, microscopically and closely pebbled, growth lines barely perceptible; inner layer set off from outer layer by a shallow marginal sulcus, faintly brownish, darker at the margins.

Height mm	Width mm		
2.5	3.8	USNM 489514	Guisa, Cuba
3.0	3.8	USNM 489515	Cuba

Remarks. The shell of this species can be readily separated from its congeners of equal size by the depressed shape, the subtruncate insertion of the palatal lip

in the aperture, and especially by the deep, umbilicuslike pit with its subperpendicular sides. In several other species the umbilical area is also more or less shallowly excavated, but the excavation is not as deep nor are the sides as straight. In addition *continua* differs from *pfeifferiana* Pfeiffer in being larger and having a more or less straight-sided spire, whereas in the latter species the outline is steplike. It is wider and more depressed than *methfesseli* Pfeiffer.

Pfeiffer and others gave only Guisa as the type-locality. Arango (1879) was the first to show that the Guisa in Oriente Province was meant. The species is known only from the type-locality (Pl. 8).

This species has been credited to Gundlach *in* Poey on the basis of the 1858 reference in the *Memorias.* But here the name alone appears, without description. Pfeiffer's paper appeared in April 1858, whereas volume 2, pages 1–96 of the *Memorias* did not appear until October of the same year.

The figure given by Sowerby (1866: pl. 272, fig. 48) is not of this species.

Troschelviana (Microviana) spinopoma (Aguayo)

Plate 4, figure 11

Eutrochatella (Torreviana) spinopoma Aguayo 1943, Rev. Soc. Malac. 'Carlos de la Torre,' 1: 70, pl. 10, figs. 5–6, text fig. p. 80 (type-locality, Pan de Samá, Limpio de la Cañada, Barrio de Cañadón, Banes [Oriente]; holotype, MP 2780).

Description. Shell about 3 mm in diameter, wider than high, thin, depressed turbinate, not shining. Color very pale yellow, edge of aperture white. Whorls $5\frac{1}{2}$, moderately inflated, raised steplike above the deeply inset and moderately impressed suture; body whorl rounded peripherally, an acute, shallow notch at the posterior (upper) insertion with the aperture. Spire wide and depressed conic, apex sharply raised. Aperture widely semilunate, outer edge well rounded. Parietal wall well excavated in umbilical region, with a small, barely raised parietal callus, surface roughened by very fine, regularly spaced pustules. Palatal lip thin, entire, not flaring, slightly thickened at the widely rounded angle of the basal insertion. Columella short, shallowly concave. Axial sculpture of irregularly spaced, diagonal growth lines, crossed by more or less regularly spaced, slightly raised spiral cords. Protoconch $1\frac{1}{2}$ whorls, glassy, rounded, minutely punctate. Periostracum wanting, but shell in life encrusted. Inner chitinous layer of the operculum very thin, pale brown, separated from the outer calcareous layer by a distinct marginal sulcus. Outer layer thin, translucent, greenish grey in color, deeply dished, outer margin with raised, regularly and closely spaced lamellae, which in the depressed center rise into high, slightly curved, sharp papillae; outer margin denticulated by the tips of the lamellae.

Height mm	Width mm	
2.4	2.9	Baracoa
3.0	3.2	"
2.3	3.2	"

Remarks. The shells of this species closely resemble *rupestris* Pfeiffer and *holguinensis* Aguayo in size and shape. They can be readily separated by the presence of the notch on the body whorl at the posterior apertural insertion, the rounded rather than carinate periphery, and the sculpture of the parietal callus which has the surface covered with finer and more regularly spaced pustules. The operculum differs from that of *holguinensis* in being thinner and in having higher, more slender and sharper papillae. The species has been reported from Banes and Baracoa, and probably will be found in areas between the two (Pl. 7).

Specimens examined. Oriente. Baracoa.

Troschelviana (Microviana) pfeifferiana pfeifferiana (Pfeiffer)

Plate 4, figure 9

Helicina pfeifferiana (Arango) Pfeiffer 1866, Malak. Blät., 13: 64 (type-locality, Yunque de Baracoa [Oriente]; lectotype, here selected, MCZ 73864, ex Arango; paralectotype, MCZ 273214 same data); 1876, Monographia Pneumonopomorum Viventium, suppl. 3: 251.

Trochatella pfeifferiana Arango 1879, Contribución Fauna Malacológica Cubana, p. 44.

Eutrochatella (Artecallosa) pfeifferiana Pfeiffer. Wagner 1908, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 2, p. 138, pl. 22, figs. 15–16.

Description. Shell about 3 mm in diameter, width and height almost equal, depressed turbinate, rather thin, in life generally encrusted. Color glassy white, occasionally with a lemon yellow tinge. Whorls 5½ to 6, subcarinate, earlier whorls raised steplike above the well-impressed suture. Spire low conic, sides strongly marked by the steplike character of the whorls. Aperture very oblique, widely semilunate, same color as shell. Parietal wall rounded, strongly excavated in umbilical region, with a very thin, narrow, strongly and regularly punctate parietal callus. Palatal lip thin, entire, slightly thickened within, not flaring. Columella rather short, almost straight above, strongly rounded at insertion with basal lip. Sculpture of weak irregular growth lines only; spiral sculpture wanting. Protoconch 1½ whorls, rounded, microscopically punctate, sharply raised. Periostracum, except for encrusted matter, wanting. Operculum translucent, outer calcareous layer dull, minutely and thickly punctate; inner chitinous layer thin, darker in color at the margins, concentric growth lines not clearly perceptible.

Height mm	Width mm	
3.0	2.6	Yunque de Baracoa, lectotype
2.3	2.6	paralectotype (juvenile)
2.5	2.5	Monte Libano

Remarks. This small species resembles the shells of *holguinensis* and *spinopoma* but differs in having a smooth, rather than a spinose, operculum. The roughened, minutely punctate parietal callus is also characteristic. Specimens vary slightly in color, but pale, almost white translucent shades predominate. It is confined to the eastern end of the island. The presence of a subspecies in the isolated Najaza Mountains of Camagüey suggests that the present species has a wider distribution than appears from the few records (Pl. 7).

Specimens examined. ORIENTE. Guaro, Monte Libano; Yunque de Baracoa.

Troschelviana (Microviana) pfeifferiana najazaensis new subspecies

Plate 4, figure 8

Description. This subspecies resembles the nominate species, but differs in having the steplike structure of the whorls more sharply angulate and in the rather dark flesh color, especially in the aperture. In addition, the axial sculpture is stronger and the spiral lines are weaker.

Height mm	Width mm	
3.1	3.0	holotype
3.0	3.0	paratype
2.7	2.6	"

Remarks. The shells are similar to *pfeifferiana pfeifferiana* in size, in shape, and in the roughened surface of the operculum and the parietal wall. In color a rufous or flesh colored tint prevails, whereas in the nominate form pale yellow and translucent white are predominant. It probably occurs only in the Najaza Mountains of Camagüey (Pl. 7), whereas the nominate form is limited to the area about Baracoa in the extreme east of Oriente. We have seen specimens only from the type locality. Holotype, MCZ 92091 (Bermúdez leg.), El Cacaotal, Najaza, Camagüey, Cuba; paratype, MCZ 127517, same data, MCZ 273217, same locality, Torre leg.

Troschelviana (Microviana) granulum (Pfeiffer)

Helicina granulum (Gundlach MS) Pfeiffer 1864, Malak. Blät., 11: 161 (type-locality, Monte Toro; type, MP ?); 1865, Monographia Pneumonopomorum Viventium, 2: 233.

Helicina granulum Gundlach. Arango 1879, Contribución Fauna Malacológica Cubana, p. 53.

Description. "Shell minute, depressed, rather thin, smooth, translucid, amber-colored; spire scarcely conoid-elevated; whorls nearly 4, rather convex, the last depressed rounded, subexcavated below, lightly callused; columella very short, vertical, aperture oblique, widely semi-ovate; peristome briefly expanded, with the basal margin inserting roundly into the columella. Operculum? Major diameter 2 2/3, altitude scarcely 1 mm," (translated).

Remarks. We have not seen this species, which does not appear to have been collected since. The description was based upon a single specimen which has never been figured. Sowerby (1866: 296) was unable to identify it, and it is not mentioned in the works of Reeve (1874) or Wagner (1908). The only smaller species of the Vianini from Monte Toro is *Troschelviana methfesseli* Pfeiffer, but *granulum* does not belong here because of much smaller size and depressed shape.

We put the species provisionally in *Microviana* because of its small size.

Troschelviana (Microviana) callosa (Poey) Plate 4, figure 15

Helicina callosa Poey 1854, Memorias Historia Natural Isla de Cuba, 1: 430, pl. 33, figs. 13–14 (type-locality, Isla de Pinos, Gundlach leg.; type, MP ?).

Trochatella callosa Poey. Pfeiffer 1856, Monographia Pneumonopomorum Viventium, suppl. 1: 176; Arango 1879, Contribución Fauna Malacológica Cubana, p. 44; Sowerby 1866, Thes. Conchyl., 3: 284, pl. 269, fig. 146.

Eutrochatella (Artecallosa) callosa Poey. Wagner 1908, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 2, p. 137, pl. 22, figs. 25–28.

Description. Shell reaching about 5 mm in height, slightly higher than wide, low conic, rather solid, sublustrous, sides strongly stepped. Color very pale brown, whitish at apex and near the aperture. Whorls 5½, obtusely carinate, earlier ones flat or weakly concave, rising steplike from the well-impressed suture, the last 2 slightly swollen; body whorl with a strong, rounded carina, descending briefly at the aperture underneath the peripheral carina. Spire widely conic, sides strongly stepped, apex sharply raised. Aperture oblique, rounded triangular, palatal angle widely rounded, a strong, white, rounded lamella entering at the upper parietal angle. Parietal wall with a heavy, subcircular, wide ridge setting off the umbilical area and extending into the aperture in the form of the lamella. Palatal lip simple, entire, not expanded, inserting with a rounded angle into the columella. Columella straight, subperpendicular, with short, rounded angles at upper and lower insertions. Sculpture of raised, widely and irregularly spaced spiral cords crossed by low, regularly and closely spaced oblique axial cords. Protoconch 1½ whorls, glassy, rounded, microscopically punctate, sharply raised. Periostracum wanting, shell frequently encrusted. Operculum subrhomboid, glassy, thin, deeply dished, columellar margin sigmoid, armed internally with a rather high, strongly pebbled columellar ridge, highest near the upper angle, and provided with a short, shallow, marginal sulcus; inner chitinous layer glassy, colorless, reaching beyond the margin of the outer layer. Nucleus laterally central, near the columellar margin.

Height mm	Width mm	
5.0	4.5	NW part of Sierra de Casas
4.75	4.5	near N end of Sierra de Casas
4.75	4.25	" "

Remarks. This species is limited to the sierras in the north central part of the Isle of Pines. The shells are unique in the family in possessing the strong, rounded lamella extending from the parietal callus

and entering into the aperture. They have the steplike character of *T. rupestris*, but are larger and more solid. The operculum is provided with a rather deeply sigmoid columellar edge to accommodate the lamellar obstruction of the aperture. The color of the shells available for this study, where they were not completely faded, was pale brown, but Poey describes the color as "rosea" or "pallida rosea." We may assume that this rose color is present in life but fades to pale brown after death.

Specimens examined. Isle of Pines. Small mogote between Sierra de Caballos and Sierra Colombo; W side, third hill from N end of Sierra de Casas; NW part of Sierra de Casas, W side of first hill (all USNM).

Key to the Species of *SEMITROCHATELLA*

1. Shell relatively large, reaching 7.5 or 10.5 mm in height 2
1. Shell relatively small, reaching 4 mm in height 3
2. Shell reaching 7.5 mm in height, surface with spiral sculpture ..... *conica*
2. Shell reaching 10.5 mm in height, surface strongly malleated ..... *elongata*
3. Shell white ..... *alboviridis*
3. Shell light brown or buff 4
4. Spiral sculpture weak, protoconch lighter than rest of shell ..... *babei*
4. Spiral sculpture strong, protoconch like burnished copper ..... *fuscula*

Genus *Semitrochatella* Aguayo & Jaume

Semitrochatella Aguayo & Jaume, Mem. Soc. Cubana Hist. Nat., 1958, 24: 101 (type-species, original designation, *Helicina conica* Pfeiffer).

Description. "Shells conical, small, the sides almost straight and the suture impressed. The lip lightly reflected. Radula apparently of the subfamily Helicininae, that is to say, with the capituliform process in the form of a comb not like a T as in the subfamily Vianinae (Proserpininae). The A-lateral with 3–4 cusps; B-lateral with 2–3 cusps, C-lateral with 2–3 cusps, the pectiniform tooth with 6–8 cusps. The marginal teeth are almost never unicusped, usually with 2 to 5 deep cusps. In the type species there are no marginals with fewer than 4 cusps." (Translated.)

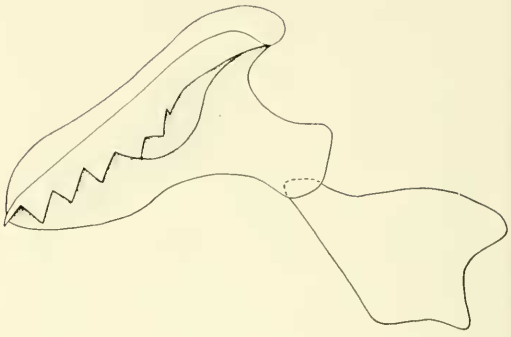

Figure 2. Lateral tooth complex of *Semitrochatella conica*.

The radula is narrower than most Vianini radula of similar length. The shape of the important comb-lateral is intermediate between that of Proserpininae, with the basal pillar more or less medially placed, and Helicininae where the basal column is terminally located (Fig. 2). The outer marginal teeth are armed with 5 cusps, and in this respect they more closely resemble the condition in Helicininae. The lateral accessory plate has the irregular rhomboid shape found in Proserpininae. There are 37 marginal teeth on each side, the innermost being unicuspid.

Remarks. We have examined the radula of some specimens of the type-species (MCZ 127676 from Pie Valdes, Yaguajay, Las Villas Bermúdez Collection). As Aguayo & Jaume stated (*loc. cit.*) their new genus seems to stand between the two subfamilies Helicininae and Vianinae (=Proserpininae). In shell characters it stands very near the latter, especially the tribe Vianini, but in the radula it has several features characteristic of the Helicininae. Nevertheless, we think that the genus had best be kept in the Proserpininae, tribe Vianini. The shape of the comb-lateral is very close to Stoastomatini, which is one of the tribes placed in the Proser-

pininae, and the shell shape, as stated, is that of another tribe of the Proserpininae, Vianini.

Semitrochatella conica (Pfeiffer)
Plate 5, figures 1–3

Helicina conica Pfeiffer 1839, Wiegmann's Arch. Naturgesch., 5th year, 1: 355 (Cuba; lectotype[1], here selected, MCZ 273210 [Trinidad], ex Dohrn; paralectotypes, same MCZ 273212).
Trochatella conica Pfeiffer. Sowerby 1847, Thes. Conchyl., 1: 9, pl. 3, fig. 101.
Helicina elegans Orbigny 1842, Mollusques, *in* Sagra, Histoire Physique, Politique et Naturelle de l'Ile de Cuba, Paris, 1: 250, pl. 20, figs. 13–15 (l'intérieur de l'Ile de Cuba; type not in BM(NH), location unknown).
Helicina elongata Pfeiffer 1852, Monographia Pneumonopomorum Viventium, p. 389 (type-locality, "Isla de Pinos" prope Cubam), not Orbigny 1842.
Trochatella conica Pfeiffer 1850, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 1, p. 7, pl. 5, figs. 9–11.
Eutrochatella (*Artecallosa*) *conica* Pfeiffer. Wagner 1908, *op. cit.*, sect. 18, pt. 2, p. 136, pl. 23, figs. 5–6.
Semitrochatella conica anafensis Aguayo & Jaume 1954, Mem. Soc. Cubana Hist. Nat., 24: 102 (type-locality, Peña Blanca, Sierra Anafe, Pinar del Río, Cuba; holotype, MP 17437).

Description. Shell about 8 mm in height, low conic, higher than wide, not shining, moderately thin. Color pale flesh or very pale yellow, lip and callus white, whorls about 6, moderately inflated; body whorl more than three times wider than penultimate whorl, rounded peripherally, descending near aperture; suture well impressed. Spire widely conic, apex well raised. Aperture widely semilunate. Callus on parietal wall smaller than aperture, white, opaque, raised, unevenly rounded at outer margin, surface strongly roughened. Lip white, thin, flaring but not reflected, widest in center, narrowest at terminations. Columella short, oblique, angled at insertion of basal lip. Sculpture of diagonal, closely set growth lines, crossed by raised, unevenly spaced spiral cords, weak on early whorls, strongest at base. Fine, wavy axial lineolations are visible within the shell substance. Protoconch $1\frac{1}{2}$ whorls, minutely pitted, sharply raised. Periostracum wanting, but live shells frequently covered by irregular layer of inorganic matter. Operculum strong, concave, calcareous layer opaque, faintly colored in center, white at outer edges, surface roughened like surface of parietal callus. Inner corneous layer pale buff, not reaching outer margin of calcareous layer. Nucleus lateral central near parietal margin, growth lines unevenly concentric.

Height mm	Width mm	
6.3	5.4	lectotype
6.1	5.1	Abra del Yumurí, Las Villas
7.8	6.4	Esperón, Sierra Anafe, Pinar del Río
7.5	7.5	Esperón, Sierra Anafe, Pinar del Río
6.0	5.1	Casa Azul, Cárdenas, Las Villas
5.8	5.7	Guanajay, Pinar del Río

Remarks. This species can be recognized by its low conical shape, by its comparatively large body whorl, by the roughened surface of the operculum and parietal callus and by the stronger or weaker spiral sculpture which covers practically the entire shell. It is quite uniform throughout its range, the various populations differing only slightly in color and size. It ranges from about the center of Pinar del Río at Sierra la Güira, through Havana and Matanzas, and reaches to the eastern part of Las Villas at Yaguajay (Pl. 7). It resembles *scopulorum* (Morelet) from the Isle of Pines but *scopulorum*, besides being lower and more widely conic in shape, has a less widely flaring palatal lip.

The name *anafensis* was given as a subspecies to the larger specimens from the Sierra de Anafe. However, populations of large and small shells are scattered throughout the range from Pinar del Río to

[1] According to Dance (1966: 297), H. Dohrn acquired the L. Pfeiffer collection. The material from Dohrn in the MCZ may thus be assumed to have been examined by Pfeiffer and may serve as the basis for type-selections.

Las Villas. The size of the shells is probably determined by ecological conditions and needs no taxonomic recognition.

Specimens examined. Pinar del Río. La Furnia, Sierra La Güira; San Diego de los Baños; La Tumba, Candelaria; Las Animas; El Retiro (both Rangel); El Mamey, Callajabos (Cayajabos); Ceiba del Agua (both Guanajay); Artemisa; Monte Cristo, Limonar; El Toro, Sierra Limones; Peña Blanca; Esperón (both Sierra Anafe); Havana. Vereda El Padre; Finca El Inglés; extreme east of Sierra el Grillo (all Sierra El Grillo); E of Zanabria, Madruga; Caimita de Guayabal; Camoa. Matanzas. 5 km W of Ceiba Mocha; Abra del Yumurí. Las Villas. *Soledad:* La Portuguesa, Seboruco; Sierra de San Juan; Mina Carlota, Sierra de San Juan; Limones Seboruco, 1 mi. SE of Soledad; El Hacha; Murciélagos (both Vega Alta); Mogote between Vega Alta and Piedras; Trinidad; Morales, Jumagua, Sagua La Grande. *Zulueta:* Cueva la Veinte; Charco Majá; El Boquerón de Jatibonico. *Yaguajay:* Camaján; Pie Valdés; Canón del Yigre; Muguirre. *Cienfuegos:* Vega de Los Negros, Arimao.

Semitrochatella alboviridis (Pfeiffer)
Plate 4, figures 1–2

Helicina alboviridis (Wright MS) Pfeiffer 1864, Malak. Blät., 11: 108 (type-locality, Ysabel Maria und Vignales an Felswänden; lectotype, here selected, MCZ 73778, ex Tryon; paralectotype, MCZ 73777, J. G. Anthony Collection ex Gundlach); 1865, Monographia Pneumonopomorum Viventium, suppl. 2: 165.

Helicina alboviridis Wright. Arango 1879, Contribución Fauna Malacológica Cubana, p. 56.

Eutrochatella (*Ustronia*) *alboviridis* (Wright) Pfeiffer. Wagner 1908, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 2, p. 125, pl. 24, figs. 12–13.

Eutrochatella (*Troschelviana*) *alboviridis* ("Wright" Pfeiffer). H. B. Baker 1922, Proc. Acad. Nat. Sci. Philadelphia, 74: 59.

Description. Shell about 4 mm in diameter, elevated conic, shining, smooth, rather solid. Color white, dark olivaceous at spire, a band of similar color occasionally on the base below the carina and in the columellar area. Whorls 7, rounded, body whorl with an obtuse but distinct carina, base somewhat flattened. Early postnuclear whorls obtusely angled at suture. Suture well impressed. Spire narrow, elevated; apex sharp, white. Aperture widely semilunate, irregularly rounded at outer margin, less rounded above. Parietal wall somewhat inflated, with a narrow, glassy, minutely punctate callus near the columella. Outer lip oblique, sinuous, retracted sharply into body whorl at dorsal insertion. Columella short, very oblique, obtusely angled at insertion into basal lip. Sculpture of fine, diagonal growth lines. The narrow, undulate axial lineolations in the shell substance appear on the penultimate whorl where they run in a generally more diagonal direction than those on the body whorl. On the base these lines are finer and more broken, and radiate from the umbilical region as center. Protoconch 1½ whorls, milk white, rounded, microscopically pitted, raised above succeeding whorls. Periostracum wanting. Operculum glassy, concave, columellar edge with a strong, rounded, rather wide ridge, outer margin thin.

Height mm	Width mm	
3.6	3.4	Isabel María (lectotype)
4.2	3.4	" " (paralectotype)
4.3	3.6	Dos Hermanos
3.3	2.6	La Muralla

Remarks. This species is easily recognizable by its shining texture, white color, and darker apical and basal areas. Under moderate magnification the strong wavy axial ornamentation will immediately help identify the species. It differs from *mestrei* Arango in its smaller size, different color, and in having a rounded rather than acute periphery.

The darker areas prove to be translucent in dead, weathered specimens, and the subperipheral line is sometimes absent. In life this is a handsome species, especially

striking being the rather wide, well-delimited olive line margining the base in most specimens. The line fades in dead collected shells. The only lots we have seen prove to consist of few specimens, indicating that it is either a scarce form or that it is not easily seen on the lichens where, according to Arango (1879), it lives.

We have specimens of this species from the type-locality, Dos Hermanos in Viñales, and La Muralla on the road to Guane (Pl. 8). This is an extensive distribution and the lack of intermediate occurrence—or even more extended limits of its range—is undoubtedly due to the small size of the shell which is easily overlooked by collectors bemused by larger, more spectacular species.

Specimens examined. Pinar del Río. Isabel María; Dos Hermanos, Viñales; Punta de La Muralla, Guane; Luis Lazo; Lagunillas, Consolación del Norte.

Semitrochatella babei (Arango)
Plate 4, figures 18–19

Helicina (*Trochatella*) *babei* Arango 1876, An. Real Acad. Cien. Méd., Fís. Nat. Habana, 12: 281 (type-locality, Sabana de Robles [Matanzas][1]; type, MP?).

Trochatella babei Arango 1879, Contribución Fauna Malacológica Cubana, p. 45.

Helicina cisnerosi Arango 1879, *op. cit.*, p. 134 (type-locality, Bebedero, Pinar del Río; lectotype, here selected, MCZ 73867, Cerro Cabras, Pinar del Río, Arango leg.; paralectotype, same data, MCZ 273218).

Helicina cisnerosi Arango. Crosse 1890, Jour. de Conchyl., 38: 313, pl. 6, figs. 7, 7a, 7b.

Description. Shell about 4 mm in height, rather broadly conic, moderately thin, subcarinate, translucent, moderately shining. Color light brown, frequently with a pale, well-defined line just above and bordering the carina, lip white. Whorls 6½, weakly inflated, body whorl roundly carinate at base. Suture strongly impressed. Spire broadly conic, apex raised. Aperture widely sublunate, light colored at outer margin. Parietal wall smooth, sublustrous, marked by rather distantly spaced microscopic pits. Parietal callus barely perceptible. Palatal lip entire, barely flaring, straight at summit, a rounded, triangular protuberance at basal insertion. Columella short, evenly concave. Axial sculpture of rather strong diagonal growth lines crossed by raised, stronger, subregularly placed spiral cords on the later whorls. There are also wide, low, whitish, wavy axial lines within the shell substance confined to the region of the carina and the base. These lines are so closely spaced on the carina that they give the impression of a white peripheral line. Protoconch 1½ whorls, rounded, weakly punctate, sharply raised, somewhat lighter in color than the rest of the shell. Periostracum wanting. Operculum concave, glassy in center, darker colored at outer margin.

Height mm	Width mm	
4.1	3.9	Cerro Cabras (lectotype)
4.2	3.6	Hoy del Guamá, Pinar del Río
4.0	3.5	Mendoza, Jaruco, Havana
4.0	3.3	Sabana de Robles, Matanzas

Remarks. This species resembles *alboviridis* in size, but differs in being brown rather than white, in lacking the subperipheral dark or pellucid band, and in the presence on the later whorls and the carina of spiral grooves. The peculiar wavy axial lineolations are confined to the lower portions of the body whorl instead of being distributed over most of the shell. It differs from *fuscula* in its smaller size and darker color, and in lacking the burnished color of the protoconch.

On the basis of the very general Latin descriptions, it is impossible to distinguish

[1] Arango did not locate the type-locality in its province. In Matanzas (22° 57'N, 81° 53'W) there is a Sabana de Robles (also called Sabanas de Roble, Roble, Robles), not far from Canímar in Matanzas, and Jaruco and Camao in Havana where this species was subsequently taken. Hence we assume that Arango's type-locality is in Matanzas though localities with identical names appear in some of the other provinces of the republic.

babei from *cisnerosi*. The former seems not to have been figured, whereas *cisnerosi* was figured by Crosse (1890) from specimens supplied him by Arango.

There is some confusion regarding the reported dimensions of these two taxa. According to Arango, *babei* is greater in height than in width ($4 \times 3\frac{1}{2}$ mm). Yet in contrasting this species with *rupestris*, which is wider than high (2.8×3.4 mm, for example), Arango makes no mention of this important difference in dimensions and outline. At the same time the dimensions which he gives for *cisnerosi* are for a shell greater in width than height ($3 \times 3\frac{1}{2}$ mm), but the figures presented by Crosse show a shell definitely higher than wide. Furthermore, *cisnerosi* is compared to *fuscula*, a species having a shell that is higher than wide, with no mention made of this fact.

It is also important to note that Arango did not contrast his species *babei* with *cisnerosi*. On the basis of the material available to us, determined by Arango (*cisnerosi*) and P. Bermúdez (*babei*), we can detect no consistent difference. The species ranges from near the middle of Pinar del Río Province to the western end of Matanzas (Pl. 7). Specimens of *babei* from the east, at Sabana de Robles near Matanzas City, are indistinguishable from *cisnerosi* in the west at Cerro Cabras in Pinar del Río.

Specimens examined. Pinar del Río. Cerro Cabras; Hoyo del Guamá. Havana. Mendoza, Jaruco; Sitio Perdido, Jaruco; Pozo Bonilla, Sitio Perdido, Jaruco; Camoa. Matanzas. Sabana de Robles; 1 km W of Río Canímar; Abra de Figueroa, Valle del Yumurí; Ramona, El Palenque, Ciudad Matanzas.

Semitrochatella elongata (Orbigny)
Plate 2, figures 8–9

Helicina elongata Orbigny 1842, Mollusques *in* Sagra, Histoire Physique, Politique et Naturelle de l'Ile de Cuba, 1: 251, pl. 20, figs. 16–18 (intérieur de l'île de Cuba; type BM(NH) 1854.10.4.172) [not Pfeiffer 1852].

Helicina elongata Orbigny. Pfeiffer 1858, Monographia Pneumonopomorum Viventium, suppl. 1, p. 200.

Helicina elongata Orbigny. Sowerby 1842, Thes. Conchyl., London, 1: 9, pl. 3, fig. 110.

Trochatella elongata Orbigny. Sowerby 1866, *op. cit.*, 3: 284, pl. 270, fig. 158.

Helicina elongata Orbigny. Arango 1879, Contribución Fauna Malacológica Cubana, p. 52.

Eutrochatella (*Artecallosa*) *elongata* Orbigny. Wagner 1908, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 2, p. 135, pl. 23, figs. 1–4.

Eutrochatella (*Troschelviana*) *elongata* (Orbigny) (sect. *Cubaviana*) H. B. Baker 1922, Proc. Acad. Nat. Sci. Philadelphia, 74: 60.

Description. Shell about 8 to 10 mm high, elevated conic, smooth, sublustrous, rather solid. Color wax white, occasionally with a yellowish or reddish tinge, darker in parietal region and inside the aperture, lip white. Whorls 6 to $7\frac{1}{2}$, moderately rounded, earliest postnuclear whorls roundly shelved, body whorl obtusely carinate, not descending at aperture, base well rounded. Suture strong, especially so at earlier whorls. Spire elevated conic, sides straight but deeply marked by the strong suture. Aperture oblique, broadly triangular, palatal angle widely rounded, yellow or pale reddish brown internally. Parietal wall moderately swollen, with a raised callus which is thickest at the umbilical area, generally colored pale yellow or pale orange, outer margin barely rounded. Palatal lip white, strong, flatly flaring, reflected above, widest near the center, very narrow at basal insertion. Columella shallowly concave, assuming the shape of a thin lamella near the insertion of the basal lip. Sculpture of fine growth lines. The axial lineolations within the shell substance are readily visible. Shells generally strongly malleated in a large diversity of patterns or in no pattern. Protoconch $1\frac{1}{2}$ whorls, white, rounded, minutely punctate, sharply raised. Periostracum wanting, shell frequently encrusted with a thin, uneven layer. Opercu-

lum lusterless, sharply dished, minutely but thickly pebbled, larger than the aperture, not retractable into the aperture; marginal sulcus at columellar edge only; palatal edge raised, white, opaque in mature shells, subtransparent in submature individuals so that the color of the thin, orange-brown inner layer shines through.

Height mm	Width mm	
9.0	7.5	Sierra La Güira
9.8	7.5	La Chorrera
8.5	7.3	"
10.2	6.9	"
8.9	7.7	Hoyo de Gallardo, El Queque
9.4	8.1	Puerta del Ancón

Remarks. The shells of this species are quite distinctive. They can be recognized by the high conic shape, the rounded base, the generally malleated surface which rarely has any sign of spiral sculpture, the lack of color at the umbilical area, the flat, wide, flaring lip, and the lusterless, nonretractive operculum. They differ additionally from *conica* Pfeiffer in being generally larger and more solid, and in the absence of spiral sculpture on the later whorls. They are higher and more solid than *pyramidalis* Sowerby and lack the colored columellar spot.

We have seen specimens from localities in Viñales to San Diego de los Baños and Pan de Guajaibón. The range of the species seems to be limited to the more easterly portions of the Sierra de los Orgânos (Pl. 8, 1). We are unable to confirm Arango's statement "casi toda la cordillera de los Organos" (1879: 52).

Pfeiffer (1852: 389) did not describe *elongata* Orbigny correctly, having confused it with *scopulorum*, and gave the Isle of Pines as the locality. In 1856 (pp. 148, 149) he corrected this error and in 1858 (p. 200) published a fitting description with the proper localities. It may be that the occasional reports of *elongata* occurring in the Sierra de las Casa on the Isle of Pines, e. g., Henderson (1916: 318); Poey[1] (1854: 426, 427) are based upon this error.

Specimens examined. Pinar del Río. *Viñales:* Sierra de Viñales; Hoyo de Gallardo, El Queque; Hoyo de la Cidra, El Queque; La Guasasa; Los Camerones, San Antonio; Sierra La Chorrera, San Vicente; Mogote Trujillo, Palmarito; Puerta del Ancón. *San Andrés:* Mogote de la Cidra, Caiguanabo; Sitio de la Sierra; Sierra La Güira; Sierra Chiquita, Guajaibón; Pan de Guajaibón; Mogote Colorado, San Diego de los Baños.

Semitrochatella fuscula (Pfeiffer)
Plate 4, figures 5–6

Helicina fuscula (Gundlach MS) Pfeiffer 1863, Malak. Blät., 10: 197 (type-locality, in parte occidentali insulae Cubae [Guajaibón]; lectotype, here selected, MCZ 90025, ex Gundlach, T. Bland Collection; paratypes, same data, MCZ 273231).

Helicina fuscula Gundlach. Sowerby 1866, Thes. Conchyl., 3: 284, pl. 278, figs. 465–466.

Helicina fuscula Gundlach. Arango 1879, Contribución Fauna Malacológica Cubana, p. 55.

Eutrochatella (*Ustronia*) *fuscula* (Gundlach) Pfeiffer. Wagner 1908, *in* Martini & Chemnitz, Conchyl.-Cab., (2) 1: sect. 18, pt. 2, p. 124, pl. 24, figs. 14–15.

Eutrochatella (*Cubaviana*) *fuscula* ("Gundlach" Pfeiffer) H. B. Baker 1922, Proc. Acad. Nat. Sci. Philadelphia, 74: 60.

Semitrochatella trochulina fuscula "Gundlach" Pfeiffer. Aguayo & Jaume, 1958, Mem. Soc. Cubana Hist. Nat., 24: 102.

Description. Shell about 4 mm in height, high conic, subglossy, rather thin. Color light brown to light buff, lip white, protoconch brown, burnished. Whorls 6, gently rounded, body whorl obtusely keeled, somewhat flattened at base. Suture well impressed. Spire rather steeply conic, apex sharp. Aperture oblique, widely semilunate, subevenly rounded at outer margin. Parietal callus short, narrow, triangular,

[1] Poey cited Gundlach for this species and indicated that it was "exclusivamente pinense." Since he also listed *scopulorum* in the same way, we find it difficult to guess what shells Gundlach was referring to.

raised; parietal area around columella translucent, glassy. Palatal lip expanded, narrower at dorsal and basal insertion. Columella quite short, rounded. Umbilical area with a shallow depression. Surface lightly sculptured by irregular, diagonal growth lines, crossed by indistinct, raised spiral cords. The wavy, white, rather wide lineolations within the shell substance are close spaced, readily perceptible. Protoconch 1½ whorls, color like burnished copper, sharply raised above early postnuclear whorls. Periostracum wanting. Operculum faintly tinged with brown at margins, microscopically pitted.

Height mm	Width mm	
4.0	3.7	Mogote Las Cuevitas, Viñales
4.8	3.4	El Descanso, Viñales
4.1	3.3	La Güira de Luis Lazo
4.3	3.9	"

Remarks. The shells of this species can be recognized by the small size; straight sided, conic shape; white, expanded lip; the triangular, raised parietal callus; and, the moderately obtuse keel which is white in occasional specimens. The whitish wavy axial lines are not as pronounced as in S. *alboviridis*. The protoconch in fresh specimens gleams like burnished copper when viewed under low magnification. This species is limited to the central part of Pinar del Río Province (Pl. 8). We have seen specimens from "La Güira" in Luis Lazo but did not find them to be "fere duplo maiorem" (=almost twice bigger) as Pfeiffer reported (1865: 239). Sowerby's figures show banded specimens, which we have not seen and which Pfeiffer did not include in his description. Perhaps Sowerby misinterpreted "laevissime striatula."

Specimens examined. PINAR DEL RÍO. El Descanso; Mogote Las Cuevitas (both Viñales); La Güira, Luis Lazo; Lagunillas de Consolación.

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Plate 1.

Fig. 1. *Ustronia acuminata acuminata* (Poey). MCZ 127441. Tapotype, Sierra de Guane, Pinar del Río. × 2½. Fig. 2. *Ustronia acuminata acuminata* (Poey). MCZ 257881. Falda de Pico Chico, San Andrés, Pinar del Río. × 3. Fig. 3. *Ustronia acuminata columellaris* (Poey). MCZ 257853. Ensenada de la Ayúa, San Andrés, Pinar del Río. × 2½. Fig. 4. *Ustronia acuminata acuminata* (Poey). MCZ 127441. Tapotype, Sierra de Guane, Pinar del Ría. × 3. Fig. 5. *Ustronia acuminata acuminata* (Paey). MCZ 127441. El Cuajaní, Viñales, Pinar del Río. × 3. Fig. 6. *Helicina blandiana* Poey (= *Ustrania acuminata acuminata*). Lectatype, MCZ 87885. [Pinar del Río], Cuba. × 4. Fig. 7. *Ustronia acuminata columellaris* (Paey). MCZ 257853. Ensenada de la Ayúa, San Andrés, Pinar del Río. × 3. Fig. 8. *Ustronia acuminata acuminata* (Poey). MCZ 127439. El Cuajaní, Viñales, Pinar del Ría. × 3½. Fig. 9. *Ustronia sloanii* (Orbigny). MCZ 127530. Lomas de Camoa, Habana. × 3. Figs. 10, 11. *Ustronia chrysostoma* (Pfeiffer) (= *sloanii* Orbigny). MCZ 257920. Punta de la Sabanilla, Matanzas. × 3. Fig. 12. *Ustrania sloanii* (Orbigny). MCZ 127530. Lomas de Camoa, Habana. × 3.

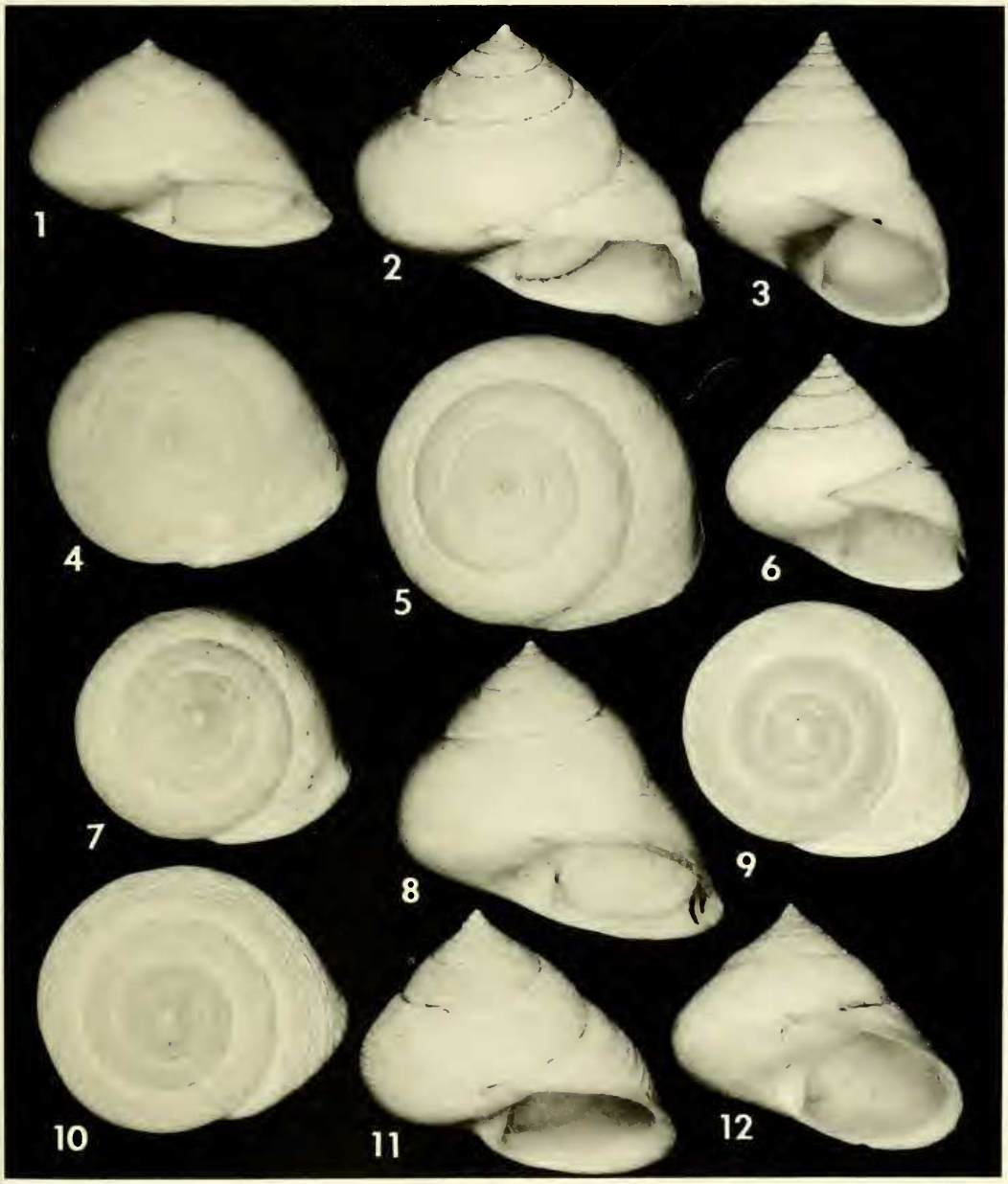
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Plate 2.

Fig. 1. *Helicina jugulata* Poey. Paralectotype, MCZ 262651. [Guane], Pinar del Río. × 3. Fig. 2. *Helicina jugulata* Poey. Lectotype, MCZ 73780. [Guane], Pinar del Río. × 3½. Fig. 3. *Helicina rubramarginata* Gundlach. Lectotype, MCZ 90024. [Guajaibón, Pinar del Río], Cuba. × 4½. Fig. 4. *Traschelviana rubramarginata* (Gundlach). MCZ 273247. Kilometer 14, Viñales, Pinar del Río. × 4. Fig. 5. *Helicina wrighti* Pfeiffer. (= *Troschelviana rubramarginata* (Gundlach)). Lectotype, MCZ 73865. [Viñales, Pinar del Río], Cuba. × 4½. Fig. 6. *Troschelviana rubramarginata* (Gundlach). MCZ 273247. Kilometer 14, Viñales, Pinar del Río. × 4. Fig. 7. *Troschelviana pyramidalis* (Sowerby). MCZ 127506. El Mamey, Cayajabos, Pinar del Río. × 5. Figs. 8, 9. *Semitrochatella elongata* (Orbigny). MCZ 257804. Sierra La Güira, San Diego de los Baños, Pinar del Río. × 4½. Fig. 10. *Helicina nodae* Arango. (= *Troschelviana rubramarginata* (Gundlach)). Lectotype, MCZ 73781. [Guane, Pinar del Río]. Cuba. × 4. Fig. 11. *Traschelviana pyramidalis* (Sowerby). MCZ 127506. El Mamey, Cayajabos, Pinar del Río. × 5. Figs. 12, 13. *Troschelviana petitiana* (Orbigny). MCZ 108957. San José, Cienfuegos, Las Villas. × 5.

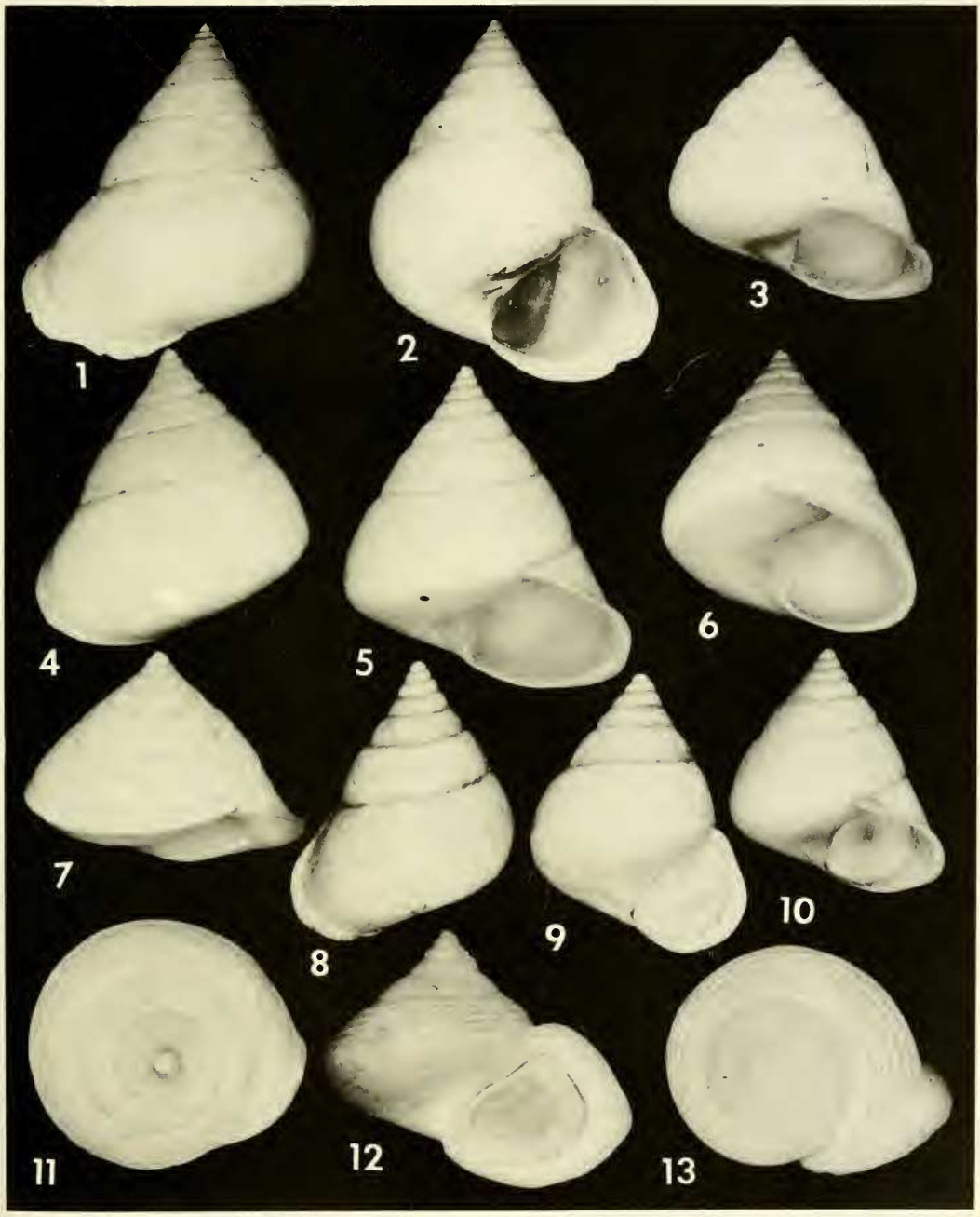
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Plate 3.

Fig. 1. *Troschelviana hians* (Poey). MCZ 127624. Paedomorph (?), El Capiro, Las Villas. × 8. Figs. 2, 3. *Troschelviana hians* (Poey). MCZ 59243. ½ mi. E of Guabairo, Soledad, Cienfuegos, Las Villas. × 0.5. Fig. 4. *Trochatella capillacea* Pfeiffer (= *Troschelviana hians*) Lectotype, MCZ 47525. [San Juan de Letrán, Las Villas], Cuba. × 10. Fig. 5. *Troschelviana hians* (Poey). MCZ 127616. Mogote el Infierno, Natalia, Calabazar de Sagua, Las Villas. × 10. Fig. 6. *Eutrochatella pilsbryi* Aguayo and Jaume. (= *Troschelviana hians*). Topotype, MCZ 127634. Harnos de Cal, Sancti Spiritus, Las Villas. × 5. Fig. 7. *Troschelviana hians* (Poey). MCZ 127616. Mogote El Infierno, Natalia, Calabazar de Sagua, Las Villas. × 5. Fig. 8. *Eutrochatella pilsbryi* Aguayo and Jaume (= *T. hians*). Topotype, MCZ 127634. Hornos de Cal, Sancti Spiritus, Las Villas. × 5. Fig. 9. *Helicina rubicunda* Pfeiffer (= *T. hians*). Lectotype, MCZ 73880. [Magua, Trinidad, Las Villas], Cuba. × 10. Fig. 10. *Eutrochatella chrysochasma hernandezi* Wagner. (= *T. chrysachasma*). Topotype, ex Anthony, MCZ 73796. [Viñoles, Pinar del Ría], Cuba. × 0.5. Fig. 11. *Eutrochatella jaumei* Clench and Aguayo (= *T. chrysachasma*) MCZ 127486. Mogote del Camino de la Mina a lo Jagua, Pinar del Río. × 5. Fig. 12. *Trochatella jucunda* Gundlach (= *T. chrysochasma*). Lectotype, MCZ 86604. Guajaibón, Pinar del Río], Cuba. × 4. Fig. 13. *Troschelviana chrysochasma* (Poey). MCZ 127480. Sierra Paso Real, Guane, Pinar del Río. × 5. Figs. 14, 15. *Semitrochatella scopulorum* (Morelet). MCZ 127492. Sierra de Casas, Isle of Pines. × 0.5. Fig. 16. *Troschelviana chrysochasma* (Poey). MCZ 80854. El Retiro, Rangel, Pinar del Río. × 5. Fig. 17. *Troschelviana chrysochasma* (Poey). MCZ 127488. Puerta de la Muralla, Guane, Pinar del Río. × 5.

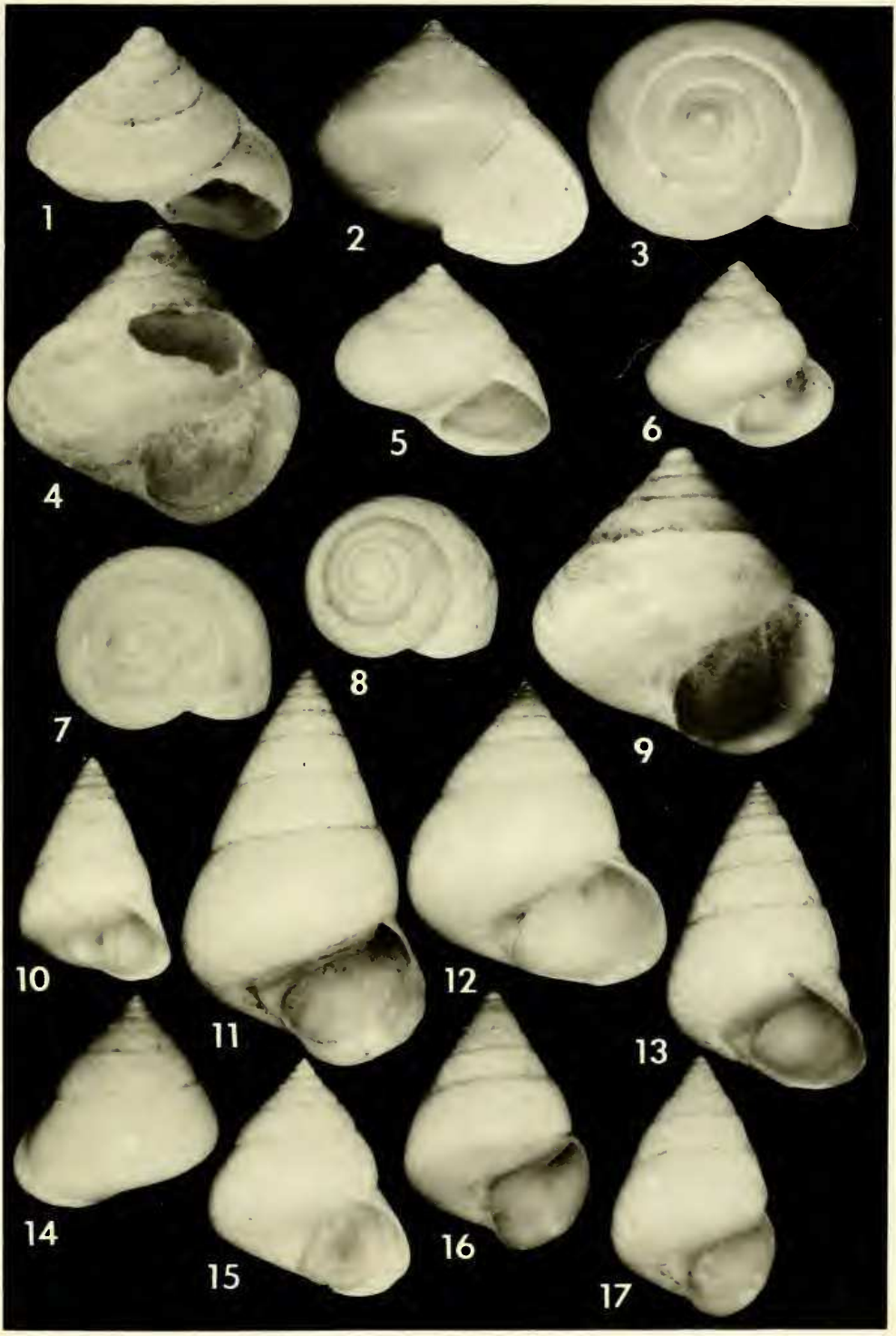
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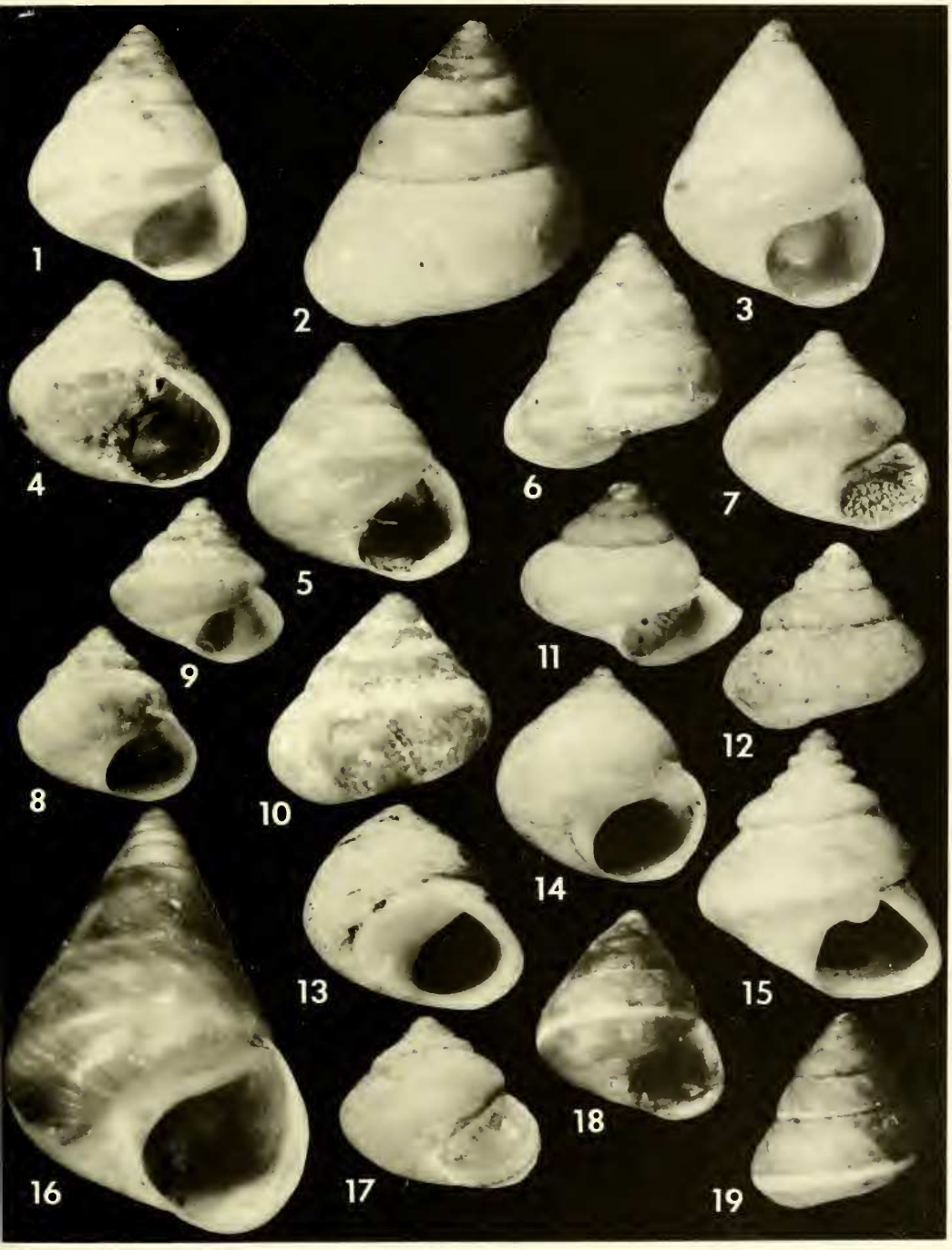
Plate 4.

Fig. 1. *Helicina alboviridis* Pfeiffer. Lectotype, MCZ 73778. Isabel María, Pinar del Río. × 10. Fig. 2. *Semitrochatella alboviridis* (Pfeiffer). MCZ 257859. Mogote Dos Hermanos, Viñales, Pinar del Río. × 10. Fig. 3. *Troschelviana erythraea* (Sowerby). MCZ 127512. Cayos de San Felipe, Viñales, Pinor del Río. × 10. Fig. 4. *Trochatella methfesseli* Pfeiffer. Lectotype, MCZ 273216. [Monte Toro, Guantónamo, Oriente], Cuba. × 8. Fig. 5. *Helicina fuscula* Pfeiffer. Lectotype, MCZ 90025. [Pinar del Río], Cuba. × 9. Fig. 6. *Semitrochatella fuscula* (Pfeiffer). MCZ 273253. Mogote Talavera, La Palma, Pinar del Río. × 9. Fig. 7. *Eutrochatella holguinensis* Aguayo. Paratype, MCZ 86493. Las Cuevas, Holguín, Oriente. × 10. Fig. 8. *Troschelviana pfeifferiana najazaensis* new species. Holotype, MCZ 273219. El Cacaotal, Najaza, Camagüey. Fig. 9. *Helicina pfeifferiana* Pfeiffer. Lectotype, MCZ 73864. Yunque de Baracoa, Oriente. × 9. Fig. 10. *Trochatella methfesseli* Pfeiffer. Paralectotype, MCZ 86494. [Monte Toro, Guantónamo, Oriente], Cuba. × 8. Fig. 11. *Troschelviana spinopoma* (Aguayo). MCZ 257916. Baracoa, Oriente. × 9½. Fig. 12. *Eutrochatella halguinensis* Aguayo. Paratype, MCZ 86493. Las Cuevas, Holguín, Oriente. × 10. Fig. 13. *Helicina littoricola* Pfeiffer. Lectotype, MCZ 86610. [Baracoa, Oriente], Cuba. × 8. Fig. 14. *Eutrochatella tumidula* Clench and Aguayo. Paratype, MCZ 52728. Silla de Gibara, Oriente. × 8. Fig. 15. *Troschelviana callosa* (Poey). USNM 429111. W side, 3rd hill from N end of Sierra de Casas, Isle of Pines. × 10½. Fig. 16. *Helicina mestrei* Arango. Cotype, MCZ 53782. Cerro de Cabras, Pinar del Río. × 10. Fig. 17. *Troschelviana rupestris* (Pfeiffer). Topotype, MCZ 73877. [Fundador, Matanzas], Cuba. × 9. Fig. 18. *Semitrochatella babei* (Arango). MCZ 273250. Hoyo del Guamá, Viñales, Pinor del Río. × 8. Fig. 19. *Helicina cisnerosi* Arango (= *babei* Arango). Lectotype, MCZ 73867. Cerro de Cabras, Pinar del Río. × 8.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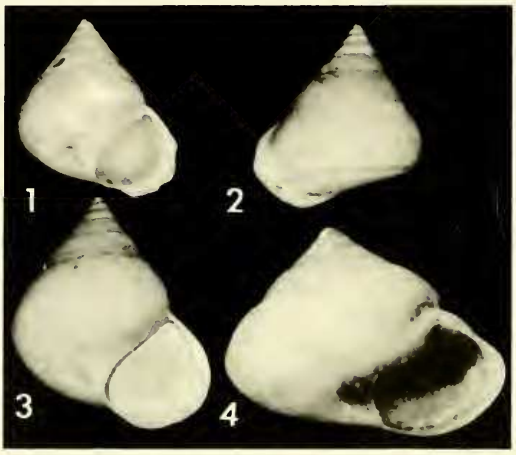

Plate 5.

Fig. 1. *Helicina canica* Pfeiffer. Lectotype, MCZ 273210. [Trinidad], Las Villas, Cuba. ×4. Figs. 2, 3. *Semitrachotella canica* (Pfeiffer). MCZ 127659. Peña Blanca, Sierra Anafe, Habana, Cuba. ×4½. Fig. 4. *Helicina continua* Pfeiffer. Lectotype, USNM 489514, Guisa, [Bayamo], Oriente, Cuba. ×10.

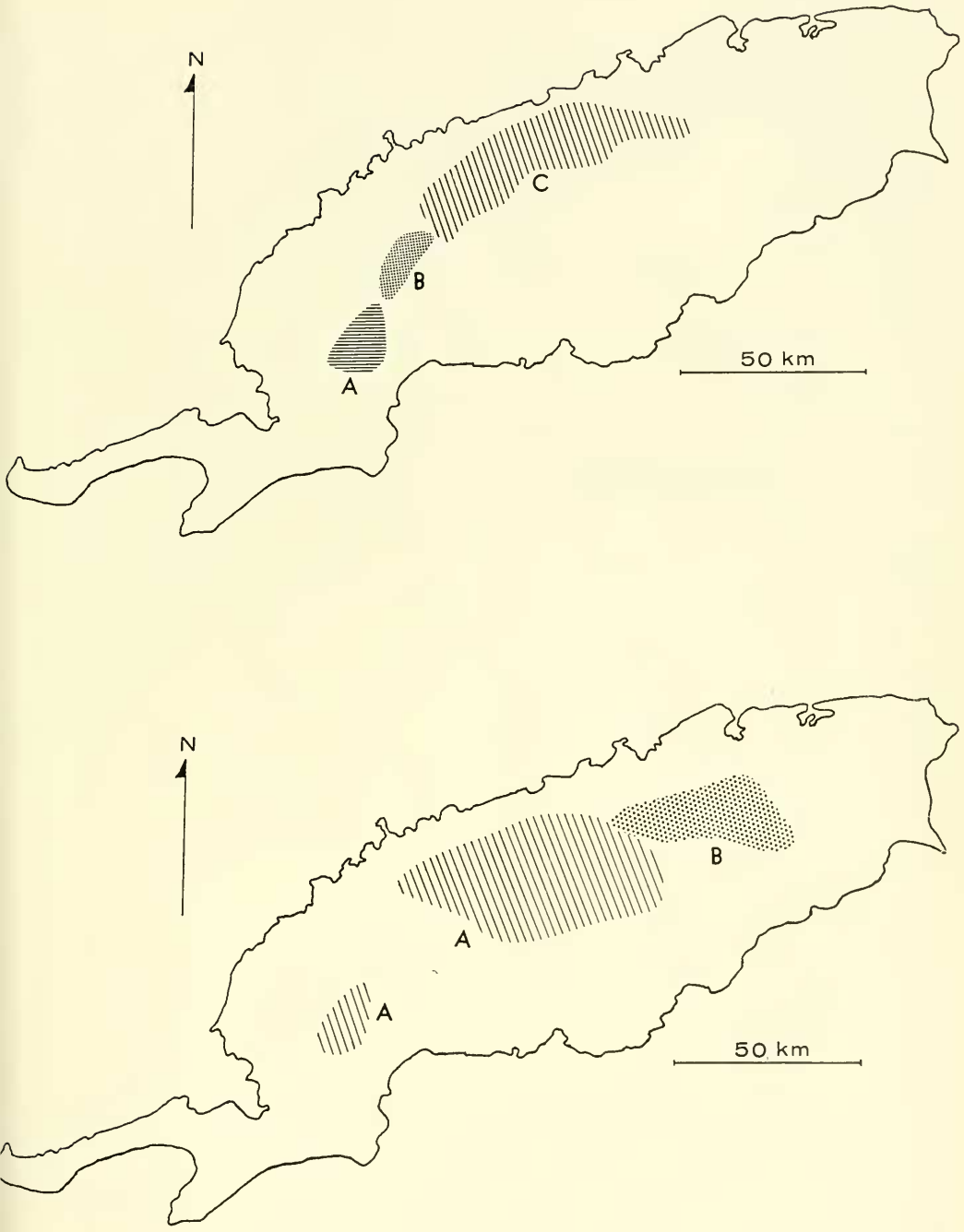

Plate 6. UPPER. Distribution of *Ustronia acuminata*, *Troschelviana jugulata*, and *T. chrysochasma* in Pinar del Río: A, *acuminata*, *jugulata*, and *chrysochasma*; B, *jugulata*; C, *acuminata* and *chrysochasma*. LOWER. A, *Troschelviana* (*Cubaviana*) *rubromarginata* and B, *T.* (*C.*) *pyramidalis* in Pinar del Río.

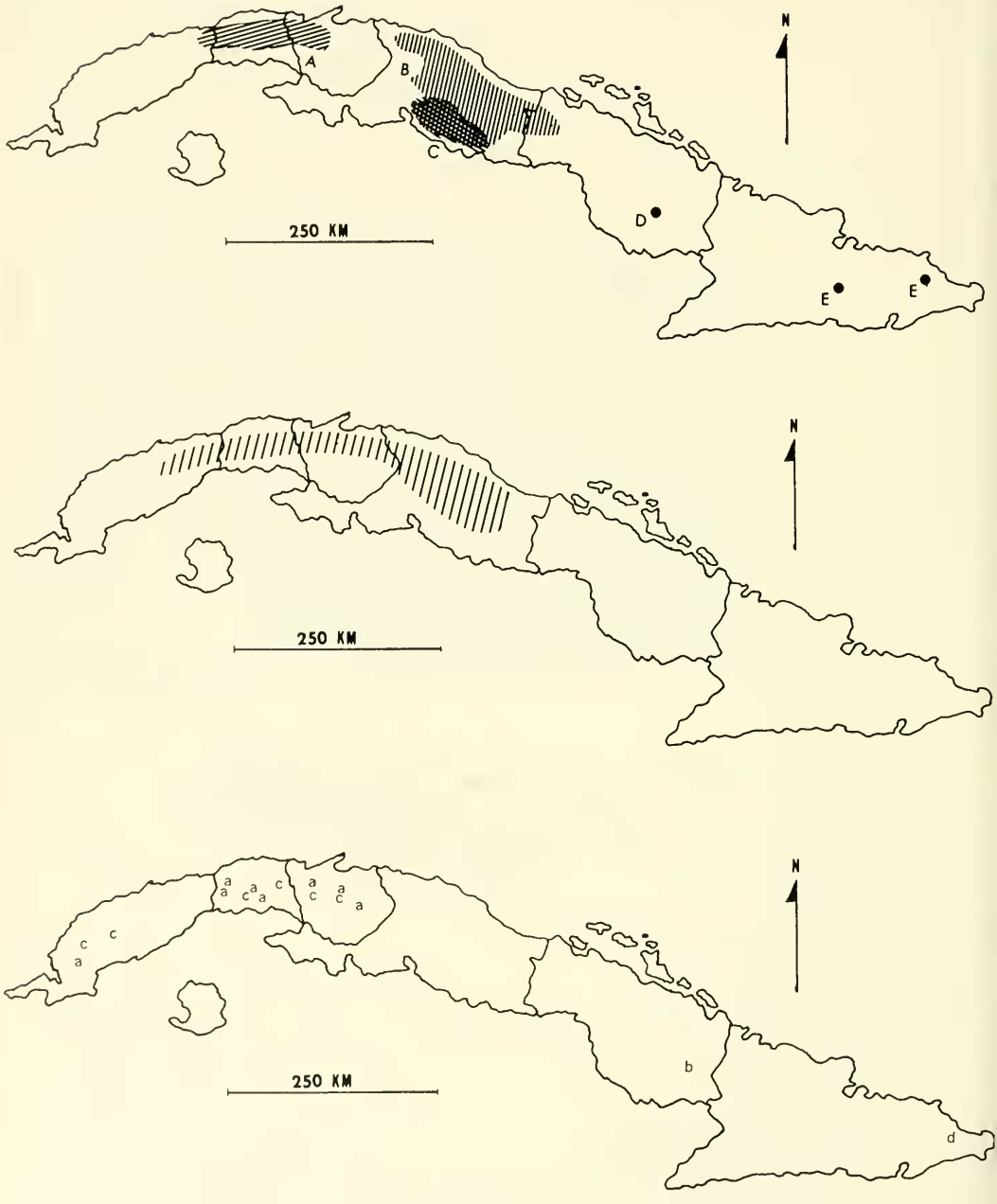

Plate 7. UPPER. Distribution of A, *Ustrania slaanii*; B, *Traschelviana* (Cubaviana) *hians*; C, *T.* (C.) *hians* and *T.* (Micraviana) *petitiana*; D, *T.* (M.) *pfeifferiana najazaensis*; E, *T.* (M.) *pfeifferiana pfeifferiana*. MIDDLE. *Semitrachatella conica*. LOWER. a, *Troschelviana* (Micraviana) *rupestris*; b, *T.* (M.) *pfeifferiana najazaensis*; c, *Semitrachatella babei*; d, *Troschelviana* (Micraviana) *spinopama*.

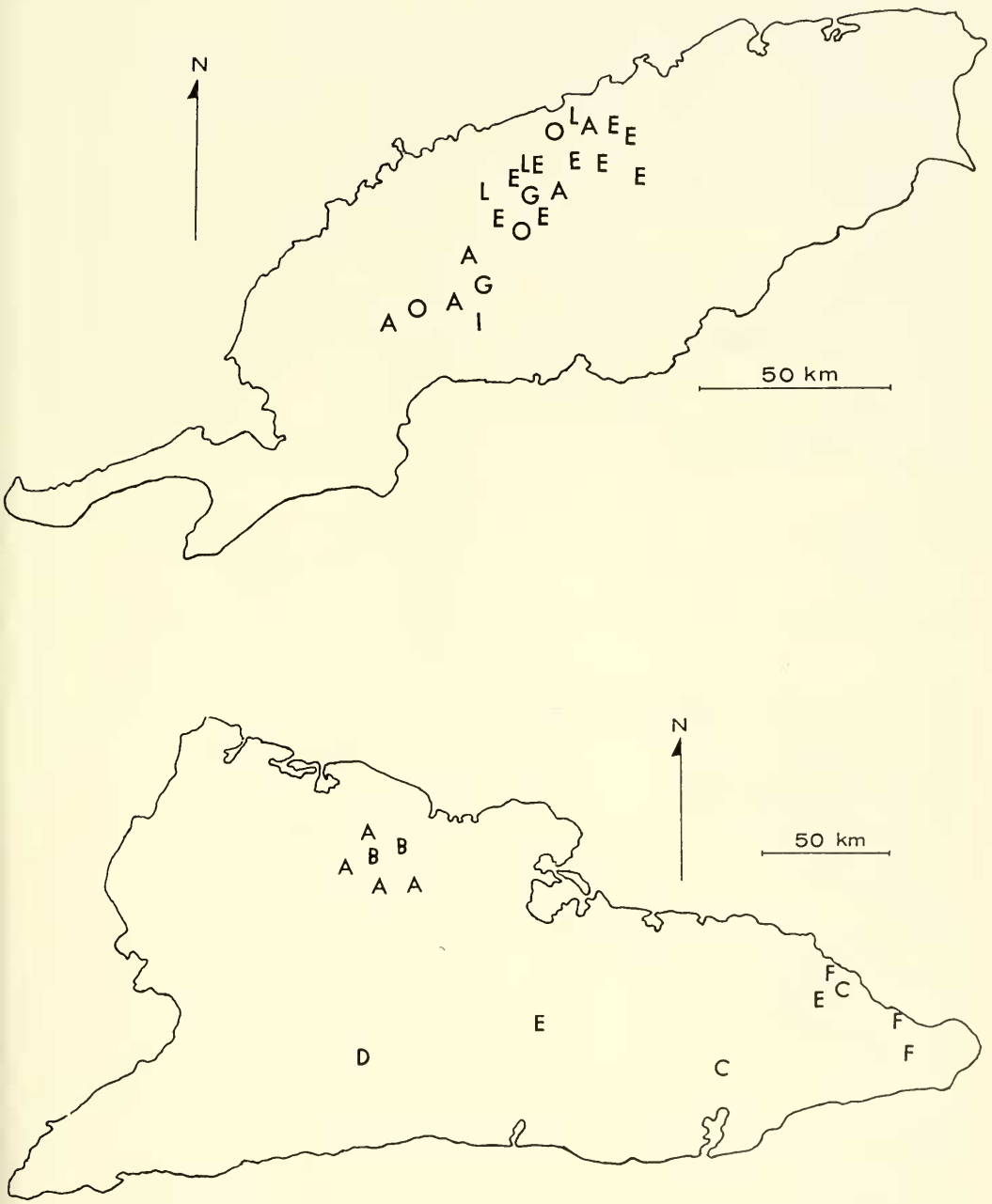

Plate 8. UPPER. Distribution of tribe Vianini in Pinar del Río: A, *Semitrochatella alboviridis*; E, *S. elongata*; L, *Troschelviana erythraea*; I, *T. mestrei*; G, *Semitrachatella fuscula*; O, *T. rubromarginata*. LOWER. Distribution of tribe Vianini in Oriente: A, *Troschelviana* (*Micraviana*) *halguinensis*; B, *T.* (M.) *tumidula*; C, *T.* (M.) *methfesseli*; D, *T.* (M.) *continua*; E, *T.* (M.) *pfeifferiana*; F, *Calida littaricala*.

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Principal references in boldface type.